5-3805-231-15

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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DS, GS,
AND DEPOT MAINTENANCE MANUAL

SCRAPER, EARTHMOVING, TOWED;
18 CU YD STRUCK CAPACITY SCOOP:
HYDRAULIC; 2 WHEELS, PNEUMATIC TIRES
(EUCLID MODEL 58SH-G)
FSN 3805-069-3316

HEADQUARTERS, DEPARTMENT OF THE ARMY
JUNE 1965

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D 101.11:

SAFETY PRECAUTIONS

Before Operation

Verify that no one is in the danger area before operating the scraper.

Install ejector lock pins and apron lock screws, when servicing or repairing, to prevent parts from falling and injuring personnel.

Install bowl lock pins before hoisting scraper.

When inflating or removing tires, remain to one side of the tire rather than directly in front of it. Serious injury may result if lock ring springs out suddenly.

When reconnecting hydraulic lines after service or repair, stand clear of connection until thoroughly tested.

During Operation

Do not carry passengers, in any manner, aboard the scraper.

Maximum rated speed of the scraper is 32 miles per hour. Do not exceed this speed. Reduce speed to compensate for rough terrain, icy, slippery or hazardous conditions.

After Operation

Park scraper on a level surface. If necessary to park on a slope, block wheels to prevent rolling.

Install ejector lock pins and apron lock screws, when servicing or repairing, to prevent parts from falling and injuring personnel.

When inflating or removing tires, remain to one side of the tire rather than directly in front of it. Serious injury may result if lock ring springs out suddenly.

When reconnecting hydraulic lines after service or repair, stand clear of connection until thoroughly tested.

TECHNICAL MANUAL
No. 5-3805-231-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 23 June 1965

ORGANIATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL

SCRAPER, EARTHMOVING, TOWED;
18 CU YD STRUCK CAPACITY SCOOP: HYDRAULIC
2 WHEELS PNEUMATIC TIRES
(EUCLID MODEL 5BSH-G)
FSN 3805-069-3316

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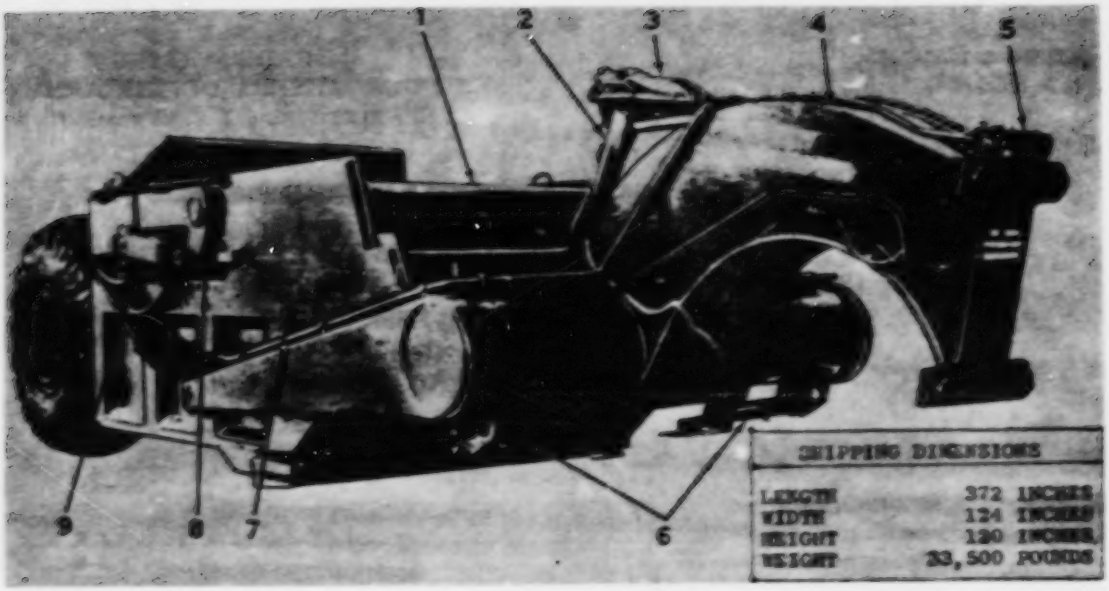

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1 Apron
2 Ejector lift cylinder
3 Ejector lift lever
4 Pull yoke
5 Manifold
6 Jack
7 Side and tail assembly
8 Apron lift lever
9 Apron lift cylinder

Figure 1. Scraper, three-quarter right front view, with shipping dimensions.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the Scoop Model 58SH–G Scraper is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the basic issue items list and maintenance and operating supplies. Appendix III contains the maintenance allocation chart.

c. The direct reporting by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to the Commanding General, U.S. Army Mobility Equipment Center, ATTN: SMOME-MMP, 4300 Goodfellow Blvd., St. Louis, Mo. 63120. One information copy will be provided to the individuals' immediate supervisor.

d. Report all equipment improvement recommendations as prescribed by TM 38–750.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For other record and report forms applicable to operator, crew and organizational maintenance, refer to TM 38–750.

Note. Applicable forms, excluding Standard Form 46 which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

c. DA Form 2258—Depreservation Guide for Vehicles and Equipment and DD Form 1397—Processing and Deprocessing Record for Shipment, Storage, and Issue of Vehicles and Spare Engines.

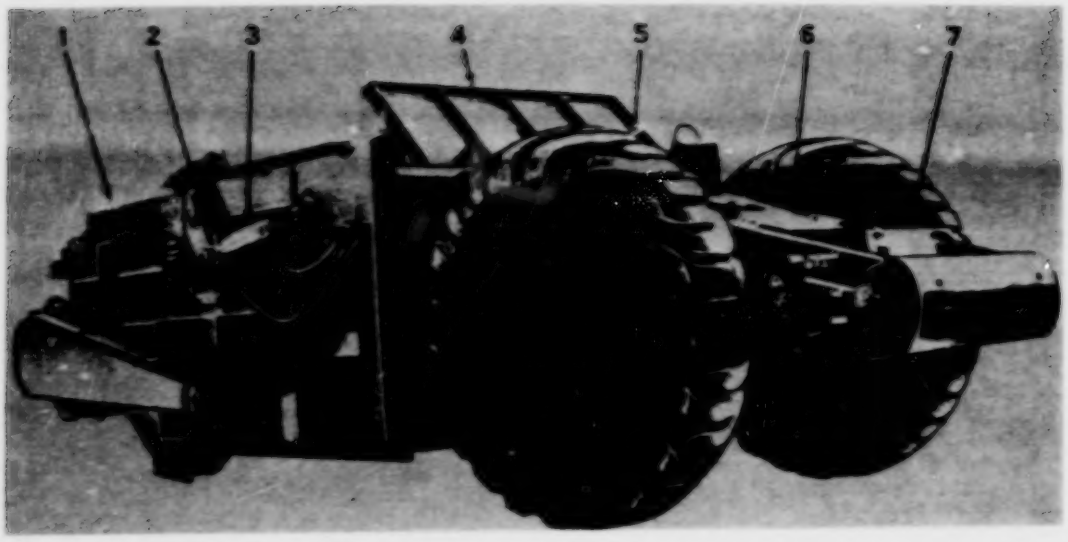
Section II. DESCRIPTION AND DATA

3. Description

a. General. The Model 58SH-G Scraper is manufactured by the Euclid Division, General Motors Corporation. It is an 18-cubic yard, towed-type, two wheel, earth-moving vehicle that receives both hydraulic power and air pressure from the prime mover through hose connections made at the pull yoke assembly.

b. Brakes. The brake system is an air-over-hydraulic, self-adjusting type in which air from the prime mover is supplied to air brake chambers on the scraper when the scraper brake valve on the prime mover is operated. The air brake chambers operate the brake master cylinder for each wheel. The hydraulic fluid, under pressure from the brake master cylinders, flows into expander tubes located in the brake assembly. The expander tubes expand under the pressure and force the brake blocks out and against the insides of the brake drums, providing the braking force.

c. Hydraulic System. The hydraulic system consists of four single-action hydraulic cylinders, one bowl control, two apron lifts, and one ejector lift. It also includes various lines and connections and the bowl lock/quick drop valve.



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1 Side and tail assembly
2 Apron lift cylinder
3 Apron lift cylinder
4 Ejector assembly
5 Tire
6 Cover
7 Tool box

Figure 2. Scraper, three-quarter left rear view.

The bowl control cylinder is used to adjust the depth of scraper cut and also to lift the cutter blades clear of the ground when cutting operation is not desired. The bowl lock/quick drop valve is a safety device to insure that the bowl remains in the position desired by the operator. The two apron lift cylinders are used to raise the apron for cutting and for controlled dumping operations. The ejector lift cylinder is used to raise the ejector so the load can be dumped.

d. Pull Yoke Assembly. The scraper is connected to the prime mover by a pull yoke assembly. The bowl of the scraper is connected to the pull yoke assembly at three points: on each side, the pull arms connect to a ball socket, and one end of the bowl control cylinder connects to the pull yoke; the other connects to the bowl. The ball sockets allow for vertical motion of the bowl in relation to the pull yoke, controlled by the bowl control cylinder.

e. Bowl and Tail Assembly. The bowl and tail assembly consists of the bowl that receives the load, the ejector mechanism that discharges the load, the tail assembly that mounts the wheels and provides a bumper when a second source of power is used to assist the prime mover, and an apron assembly that retains the load when the bowl is filled. Three cutting blades, two side and one center, are bolted to the scraper bowl.

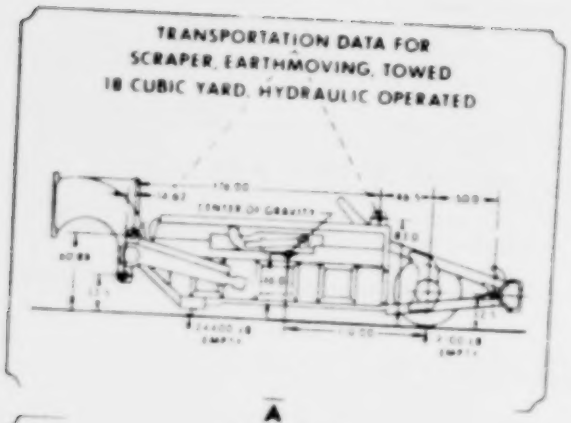
4. Identification

Three identification and nameplates are provided on the scraper. These are as follows:

a. The transportation data plate (A, fig. 3 provides shipping dimensions and weight and is located on the left side of the side and tail assembly, near the axle.

b. The lubrication plate (B) provides basic lubrication and maintenance information and is located to the right of the transportation plate on the side and tail assembly.

c. The Corps of Engineers nameplate (C) gives the official nomenclature, Federal Stock Number, and specification data for the circuit. It is located below the other two nameplates on the side and tail assembly.


TRANSPORTATION DATA FOR
SCRAPER, EARTHMOVING, TOWED
18 CUBIC YARD, HYDRAULIC OPERATED
A
LUBRICATION
LUBRICATE ALL CLEVISES WITH MIL L 2104A AMEND 1
GRADE 10 OIL LUBRICATE THE FOLLOWING WITH
MIL G 10924 GREASE SCRAPER HOIST PULL
YOKE BALL APRON MOUNTING PIN SCREW JACKS
LUBRICATE TRAILING WHEELS WITH MIL G 10924
GREASE PACK BOTH BEARING CONES CAVITY
BETWEEN BEARINGS AND HUB CAPS
FILL BRAKE SYSTEM WITH MIL L 2104 A
AMEND 1 GRADE 10 OIL
DRAIN BRAKE SYSTEM
WATER DRAIN COCK PROVIDED UNDER AIR
RESERVOIR BLEED COCK PROVIDED ON BRAKE
OIL RESERVOIR LINE BLEED COCK PROVIDED WHERE
LINE ENTERS EACH BRAKE ASSEMBLY
TIRE PRESSURE 45 PSI
B
CORPS OF ENGINEERS U.S. ARMY A
SCRAPER, EARTH MOVING, TOWED
18 CU. YD HYDRAULIC OPERATED
STOCK NO. 3-05-069-3316
SER. NO.
REG. NO.
MFG. GEN MTRS. CORP
MODEL 58SH-G
CONT. NO. DA-A-504-16-C1
DATE MFGD.
LENGTH 372" WIDTH 124" HEIGHT 120"
CAP. OR PAY LOAD 18 CU. YD. G.V.W. LBS.
SHIP. WT. 33,500# CUBE 3,203 FT.
ENG. MFGR.
MODEL
ENG. SER. NO.
INSP. STAMP
DATE INSP.
C

MEC 3805-231-15/3

Figure 3. Identification and nameplates.

5. Tabulated Data

a. General.

Manufacturer	General Motors Corp. (Euclid Division)
Model	58SH-G
Type	Towed, earth-moving
Overall length	372 in.
Overall width, at torque tube	124 in.
Overall height	120 in.
Weight (Shipping)	33,500 lb
Volume	3,203 cu ft
Maximum carrying capacity	18 cu yd

b. Accessories Items

Bowl lock/quick drop valve (Government furnished valve):	
Make	GFE
Model	FSN 2410-990-6767
Weight	71 lb
Displacement	356 cu in.
Operating pressure	2000 psi
Proof pressure	4000 psi
Tires:	
Size	29.5 in. x 29 in.
Ply rating	28 ply
Type	Tubeless, pneumatic
Quantity	2
Brake assemblies:	
Make	B. F. Goodrich
Part no.	2-907
Type	Hydraulic, self-adjusting expander tube, segmented brake block shoes
Size	22 in. x 5 in.
Brake master cylinder:	
Make	B. F. Goodrich
Model	87-84
Type	Air-actuated, hydraulic, self-adjusting
Air brake chamber:	
Make	Bendix-Westinghouse
Type	36
Size	7⅞ in. dia
Maximum stroke	3½ in.
Effective piston area	36 sq in.
Air brake reservoir:	
Make	Bendix-Westinghouse
Part no.	7005-05
Size:	
Diameter	9 11/16 in.
Length	28⅞ in.
Relay-emergency valve:	
Make	Bendix-Westinghouse
Type	RE-4
Part no.	7004-23

c. Capacities.

Air brake reservoir	1758 cu in.
Brake hydraulic fluid reservoir	1 gal (2 qt per wheel)

d. Pressures.

Tires	45 psi
Air brake system	105 psi
Hydraulic system	2000 psi

e. Torque Data.

Hydraulic system:

Bowl control and ejector lift cylinder end cap nuts and bolts	1900–2100 ft lb (dry)
Bowl control and ejector lift cylinder piston nuts	5000 ft lb (dry)
Cylinder pin mounting bolts	74–78 ft lb (dry)
Apron lift cylinder end cap nuts and bolts	400–440 ft lb (dry)
Apron lift cylinder piston nut	950–1000 ft lb (dry)
Split flange bolts	47–53 ft lb (dry)
Adapter bolts and nuts	140–160 ft lb (dry)
Connector bolts	47–53 ft lb (dry)
Bowl lock/quick drop valve face plate mounting bolts	140–160 ft lb (dry)
Hydraulic line mounting bolts and nuts	47–53 ft lb (dry)

Brake System:

Air brake chamber mounting nuts	145–155 ft lb (dry)
Air brake chamber push rod nut	230–250 in. lb (dry)
Relay-emergency valve cover bolts	100–140 in. lb (dry)
Relay-emergency piston cap nut	225 in. lb
Exhaust valve screw	100 in. lb
Air reservoir mounting nuts	22–24 ft lb (dry)
Master cylinder bracket mounting nuts and bolts	157–173 ft lb (dry)
Master cylinder mounting bolts	56–60 ft lb (dry)

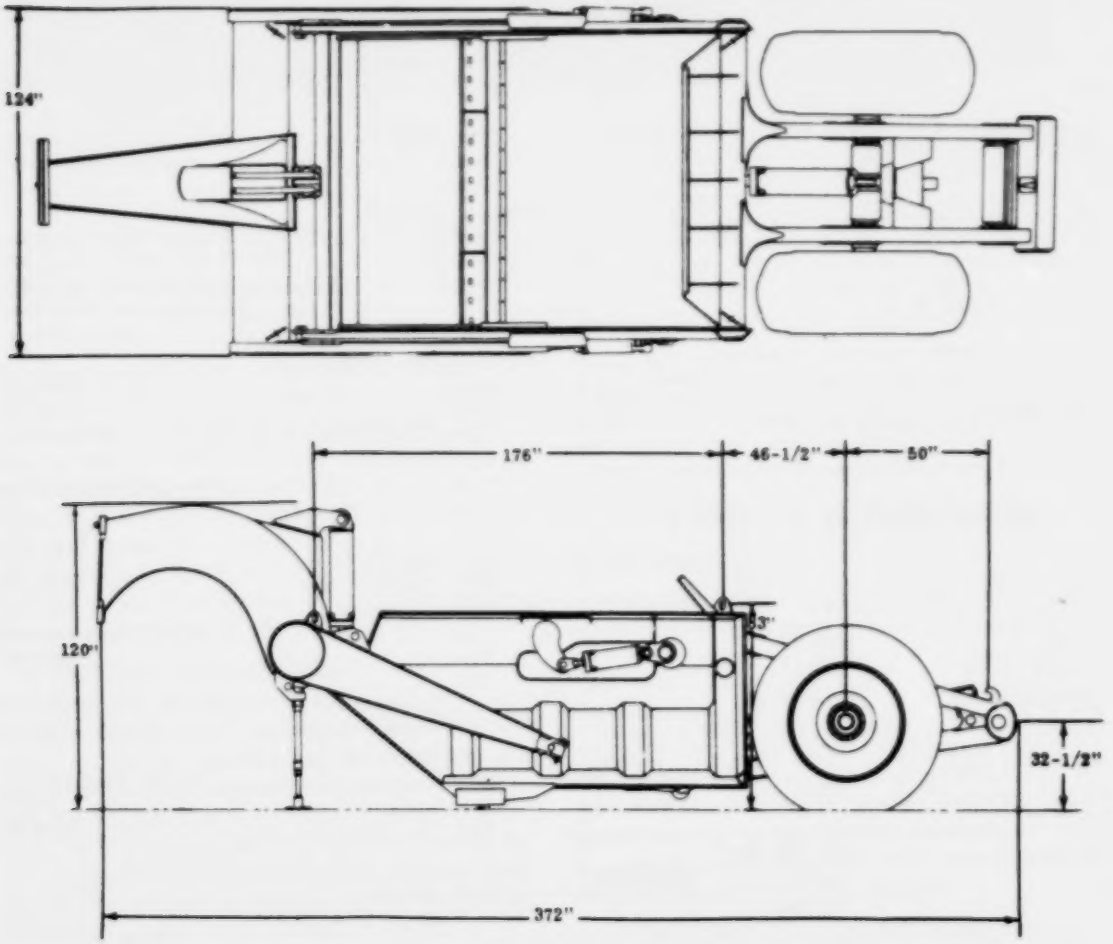


Figure 4. Shipping dimensions.

Brake assembly nuts	56–60 ft lb (lub)
Brake assembly mounting bolts and nuts	270 ft lb (dry)
Brake hydraulic fluid reservoir mounting bolts and nuts	46–50 ft lb (dry)
Pull Yoke and Bowl Assemblies:	
Center cutting blade nuts and bolts	860–945 ft lb (dry)
Side cutting blade nuts and bolts	860–945 ft lb (dry)
Wear plate mounting nuts and bolts	637–703 ft lb (dry)
Pull yoke attaching cap screws	1400 ft lb (lub)

f. Shipping Dimensions. Refer to figure 4 for shipping dimensions.

g. Maintenance and Operating Supplies (for 8-hour period).

Hydraulic fluid	MIL–L–2104A—Amendment 1
Brake hydraulic fluid	MIL–L–2104A—Amendment 1
Lubricant	MIL–G–10924

h. Performance Data.

Center of gravity	46.00 in. from ground 110.00 in. from rear axle
Ground clearance	18 in. min
Maximum allowable travel speed loaded	32 mph
Maximum cut depth	15 in.

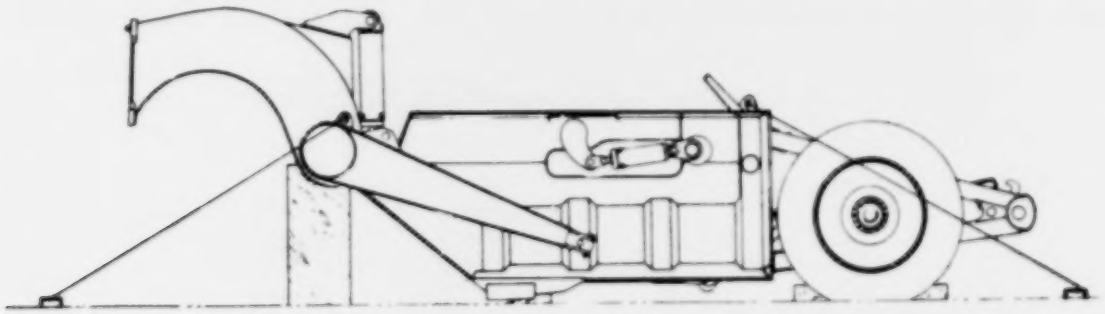
CHAPTER 2

OPERATING INSTRUCTIONS

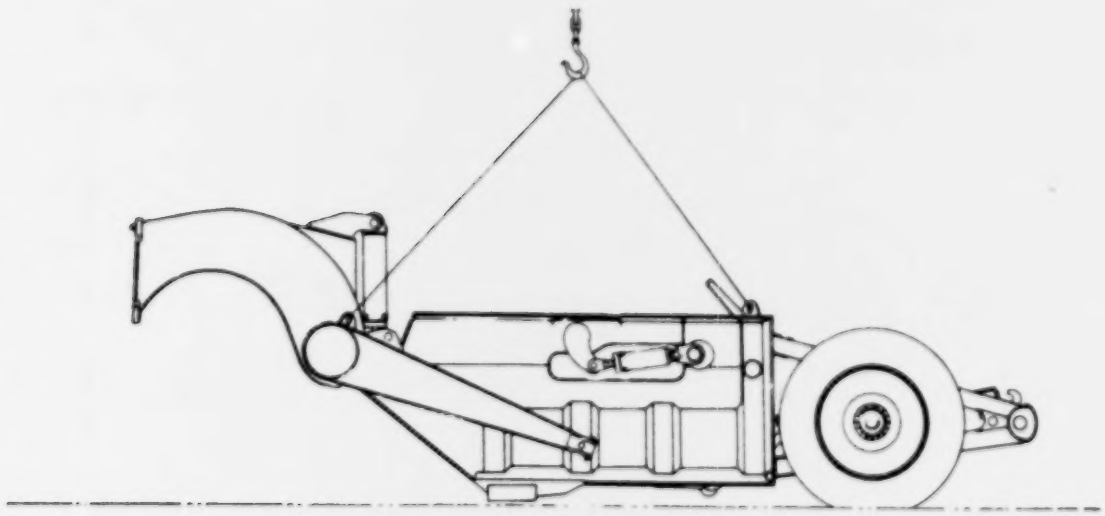
Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading Equipment

a. The scraper is shipped, tied down to the bed of a flat car or truck as shown in A, figure 5. The wheels are blocked to prevent shifting, and the bowl rests on the support blocks under the bowl. Blocking and tiedown requirements



A



B

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Figure 5. Scraper tiedown and hoisting.

vary according to the facilities available. Tiedown points are located on the torque tube at the rear of the bowl.

b. The scraper can be removed from the carrier either by use of a crane capable of handling 33,000 pounds, or, using the prime mover, it can be towed from the carrier onto a loading dock or specially constructed ramp.

(1) If the scraper is unloaded with a crane, connect the hooks of the sling to the lifting points (B, fig. 5) provided.

Caution: **Before hoisting, make sure the bowl lock pins are installed as described in paragraph 102 (3) and shown in A, figure 8.**

(2) If the scraper is to be towed off the carrier onto a loading dock or ramp: see sketch for construction of an unloading ramp figure 7, a prime mover must be used. Attach the prime mover as described in paragraph 13 and remove the tiedown lines, wheel blocks, and pull yoke blocks. Move the bowl control lever on the prime mover to the bowl raising position, then to the holding position when the bowl is clear of the bowl blocks. Remove bowl blocks and tow the scraper off the carrier as described in paragraph 15.

7. Unpacking Equipment

When a DA Form 2258 or DD Form 1397 is furnished, accomplish depreservation as outlined on the guide. If a form is not furnished, remove the waterproof tape and special packing from the brake reservoir breather.

8. Inspection of Equipment

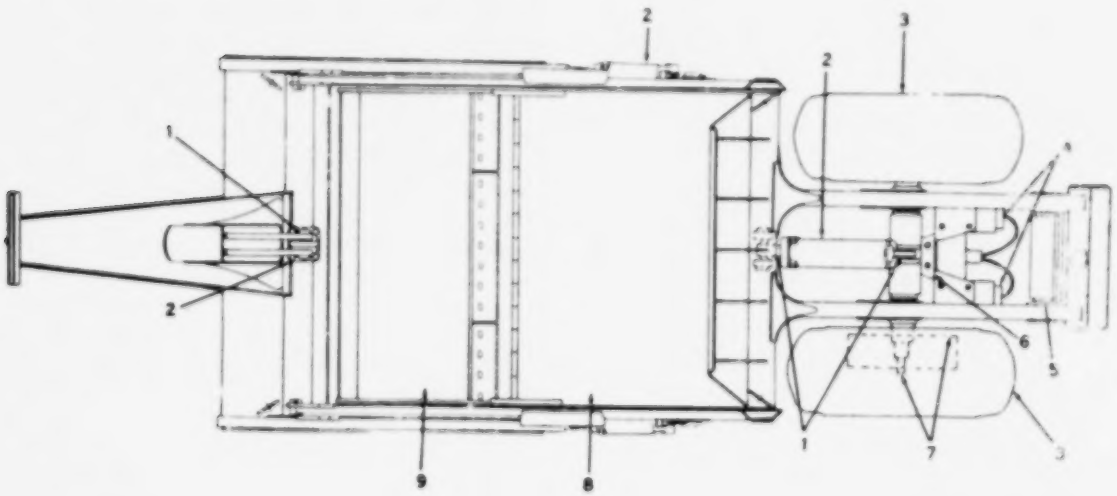
Inspect the entire scraper for loss or damage that may have occurred in shipment. Make a systematic check including the following items:

a. Lubrication Fittings. Check all lubrication fittings (1) for proper mounting.

b. Hydraulic System. Check the bowl control, ejector lift, and apron lift hydraulic cylinders (2) for secure mounting and tight hydraulic connections. Check all hydraulic lines and hoses for damage.

c. Axles and Mounting. Check the axle parts (7) for missing hardware and insecure mounting.

d. Tires. Check the tires (3) for cuts, punctures, loss of air, missing valve caps, or other damage.



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1 Lubrication fitting
2 Hydraulic cylinder
3 Tires
4 Brake lines
5 Tool box
6 Brake hydraulic fluid reservoir
7 Axle parts
8 Ejector
9 Apron

Figure 6. Inspection of equipment.

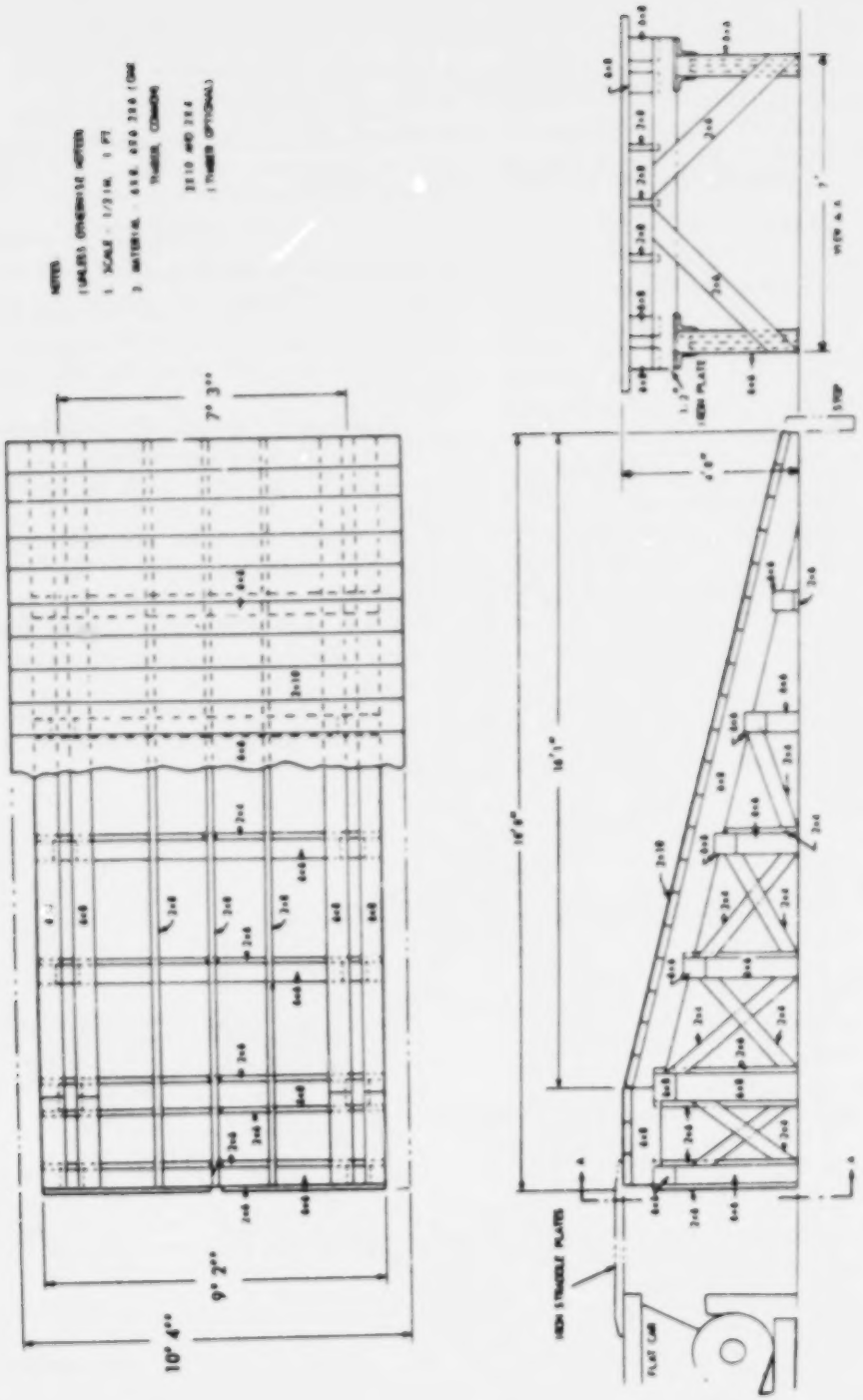


Figure 7. Loading ramp.

e. Apron and Ejector. Check the apron (9) and ejector (8) for distortion and missing parts.

f. Brake System. Inspect the brake hydraulic reservoir breather cap; inspect lines (4) for damage or leaks.

g. Attaching Parts. Check that all attaching parts are in the tool box (5).

9. Servicing Equipment

a. Fill the brake hydraulic fluid reservoir (6, fig. 6) with approved hydraulic fluid.

b. Perform all of the operator's daily preventive maintenance services as described in paragraph 26.

10. Movement to a New Site

Thoroughly clean the ejector, apron, pull yoke, tail assembly, and all other parts of the scraper usually exposed to dirt. Check the operation of the brake system as described in paragraph 53.

a. Short Distance Move.

(1) Short distance moves are made by towing scraper with a prime mover. Attach the prime mover as directed in paragraph 13.

(2) Operate the ejector lift lever on the prime mover to fully lower the ejector of the scraper. Operate the apron lift lever to fully lower the apron.

(3) Operate the bowl control lever on the prime mover to aline the bracket (A5, fig. 8) with the tube (8). Drive in the pin and secure with the bolt (1), nut (6), and lock washer (7). Repeat the procedure at the opposite side of the scraper.

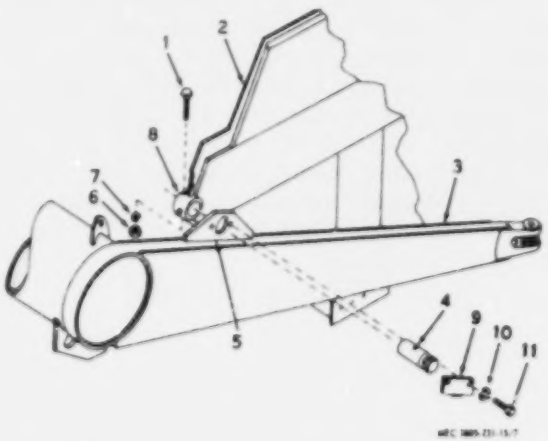
(4) Apply the brakes of the scraper using the brake control lever in the prime mover, with the brakes applied, attempt to move the scraper. The brakes should hold securely. Release the brakes.

(5) Check that no personnel or objects are in the path of the prime mover and scraper. Operate the prime mover to tow the scraper to the new location.

b. Long Distance Move.

(1) Use a loading dock or construct a ramp to position on the flat car or truck on which it is to be hauled. If a loading dock is not available, use a crane, following the hoisting procedures shown in B, figure 5.

(2) Block and tie down the scraper as shown in A, figure 5.



1	Bolt	7	Lock washer
2	Bowl	8	Tube
3	Pull arm	9	Bowl lock
4	Pin	10	Lock washer
5	Bracket	11	Screw
6	Nut		

A—Bowl lock parts, exploded view.

Figure 8. Bowl lock parts, and scraper mounting parts.

Section II. CONTROLS AND INSTRUMENTS

11. Controls

Controls for raising and lowering the bowl, raising and lowering the apron, ejecting the load, and applying the scraper brakes are mounted on and are part of the prime mover. No operator controls are located on the scraper.

12. Instruments

All instruments required for use with the scraper are mounted on and are part of the prime mover.

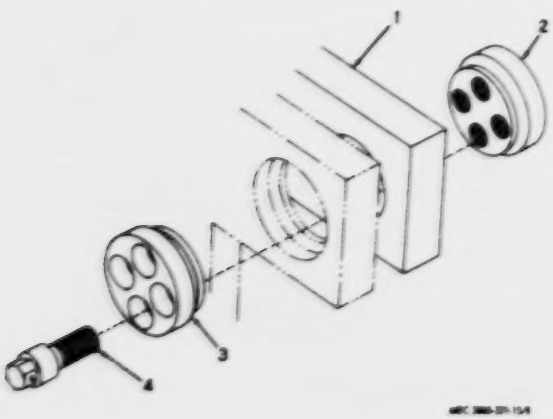
Section III. OPERATION UNDER USUAL CONDITIONS

13. Scraper Attachment

a. Slowly and carefully back the prime mover so that the scraper mounting plate (B1, fig. 8) is vertically alined with the prime mover mounting plate and the plates are almost touching.

b. Insert a bar into the turning bracket (5, fig. 9) and turn the body (6) in the direction required to raise or lower the unit to horizontally aline the mounting plates. Repeat the process using the jack on the opposite side. When proper alinement is attained, carefully back the prime mover so that the mounting plates come together with the alinement dowel on the scraper mounting plate, engaging the hole on the prime mover mounting plate.

c. Position one of the counterbored tapered plugs (B3, fig. 8) into one of the holes in the prime mover mounting plate. Position a threaded taper plug (2) into the mating hole in the scraper mounting plate (1). Lubricate the cap screws (4). Insert four cap screws through the counterbored tapered plugs and turn them into the threaded tapered plug. Turn the cap screws down evenly and alternately to a torque of 1400 footpounds.



1 Scraper mounting plate
2 Threaded tapered plug
3 Counterbored tapered plug
4 Cap screw

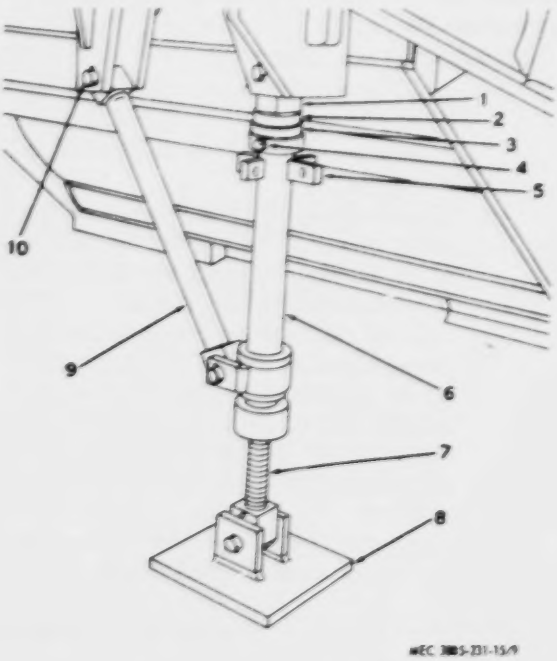
B—Scraper mounting parts.

Figure 8—Continued.

d. Repeat step c above to install the three remaining sets of tapered plugs and cap screws.

e. Insert a bar into a turning bracket (5, fig. 9) of the pull yoke jack and turn the jack body (6) to release jack tension. Continue to turn the jack body until the screw assembly (7) is fully turned into the body. Raise the jack into the stored position and install the strut retaining pin (10) and cotter pin to retain it as shown in figure 32. Repeat the procedure for the second jack.

f. Remove the two bolts (10, figure 10) and lock washers (11) that hold each of the split flange halves (12) to the manifold (9); remove the split flange halves, seal plates, and preformed packings from the connection manifold on the pull yoke. Make the hydraulic and pneumatic connections as shown in figure 10. Retain the seal plates and preformed packings and stow them on the plate in the tool box cover.



1 Spindle
2 Thrust bearing
3 Spindle bushing
4 Cap screw
5 Turning bracket
6 Body
7 Screw assembly
8 Base plate
9 Strut
10 Strut retaining pin

Figure 9. Pull yoke jack.

g. Start the prime mover and tow the scraper several feet forward. Check the tightness of the cap screws (B4, fig. 8); tighten if necessary. Install lock wire on all cap screws to prevent them from loosening.

h. Operate the controls on the prime mover to raise and lower the apron, raise and lower the bowl, and raise and lower the ejector. Carefully check the hydraulic connections for leaks.

i. Operate the controls on the prime mover to actuate the brakes of the scraper while carefully checking the air connections for leaks. No leakage should occur.

14. Disconnecting the Scraper

a. Park the scraper on a firm, level area. Block the wheels.

b. Disconnect the prime mover hydraulic and pneumatic lines from the scraper. Refer to figure 10.

c. Carefully remove the strut retaining pin (10, fig. 9) and lower the pull yoke jack. Position the strut on the bracket and reinstall the pin. Turn the base plate (8) to extend the screw assembly (7) from the body (6) until the base plate touches the ground.

d. Insert a bar into a turning bracket (5). Rotate the body to relieve all strain from the mounting plate attaching parts. Reinstall the cap screws. Repeat the procedure for the second jack.

e. Cut the lock wire and remove the four cap screws (B4, fig. 8) from each set of threaded tapered plugs (2 and 3) that secure the mounting plates together. Remove the tapered plugs and carefully drive the prime mover from the scraper.

f. Store the tapered plugs and cap screws in the tool box mounted on the tail assembly.

15. Moving the Scraper

a. Perform the daily preventive maintenance services as described in paragraph 26.

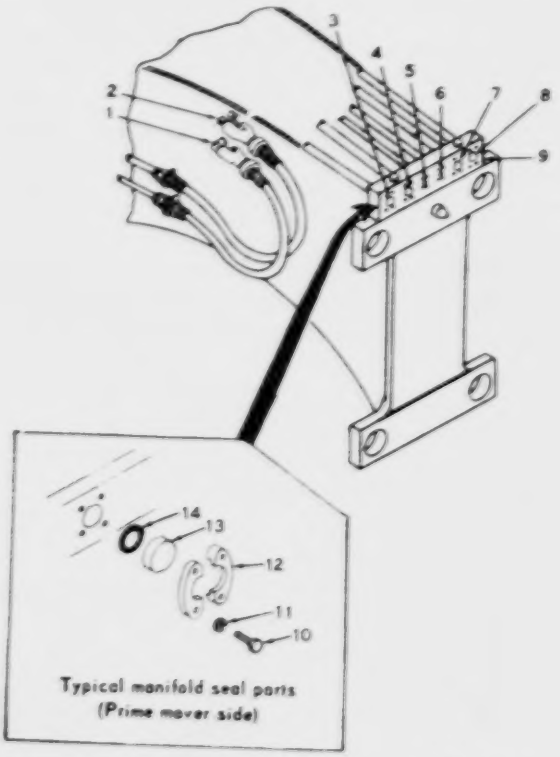
Caution: **Check that the pull yoke jacks are in the raised position before attempting to move the scraper. Refer to paragraph 13e.**

b. Check to be sure that the scraper is clear of all obstructions that may be damaged when the scraper is moved.

c. Check that the apron is fully lowered. If it is not lowered, move the apron lift lever to the lowering position until the apron is fully closed; then move the lever to the holding position.

d. Check that the ejector is fully lowered. If it is not lowered, move the ejector lift lever to the lowering position until the ejector is lowered; then move the lever to the holding position.

e. Sound the warning horn on the prime mover and visually check that no one is stand-



1 Emergency hose coupling
2 Service hose coupling
3 Bowl line connection
4 Ejector line connection
5 Quick drop line connection
6 Lock pilot line connection
7 Apron line connection
8 Common line connection
9 Manifold
10 Bolt
11 Lock washer
12 Split flange
13 Seal plate
14 Preformed packing

Figure 10. Scraper line connections.

ing in the way of the scraper or between the scraper and the prime mover.

f. Release the brakes and drive away with the scraper. Check the scraper often while moving to ensure that it is trailing properly.

16. Stopping the Scraper (fig. 8)

a. Apply the scraper brakes by operating the scraper brake valve on the prime mover; brake to a stop.

b. If it is installed, remove the bowl lock pin (4) from the tube (8) and bracket (5); lower the bowl to the ground by moving the bowl control lever to the lowering position. When the bowl is resting on the ground, move the lever to the holding position.

c. Lower the apron and ejector if they are not already lowered by moving the associated lift levers in the prime mover to the lowering position; when they are fully lowered, move the lever to the holding position.

d. Block the scraper wheels.

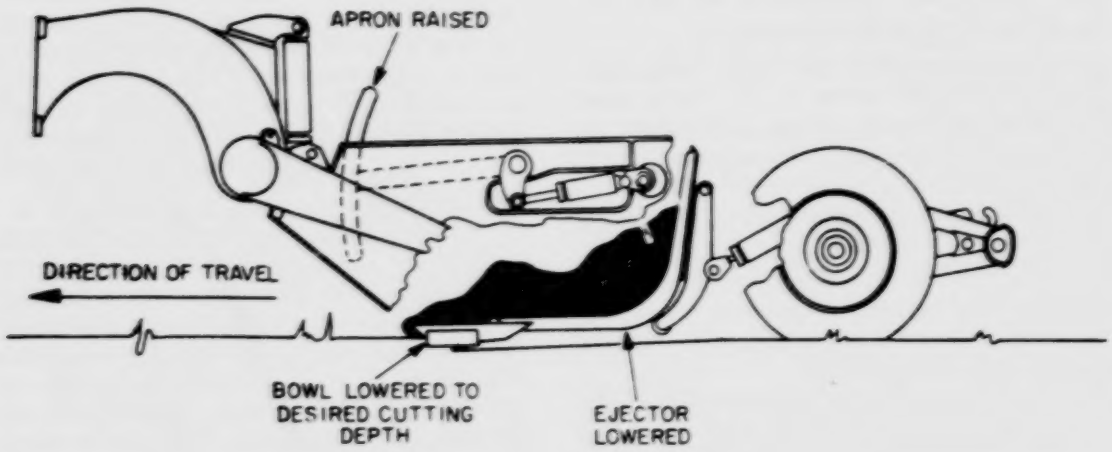


Figure 11. Loading the scraper.

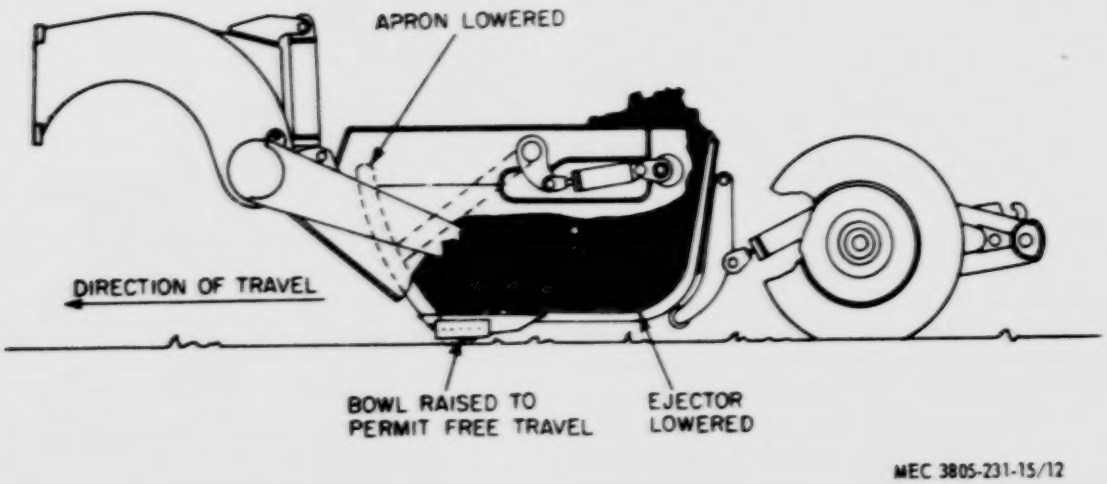


Figure 12. Carrying a load.

17. Loading the Scraper
(fig. 11)

a. Raise the apron by moving the apron lift lever to the raising position. When the apron is fully raised, move the lever to the holding position.

b. Move the scraper over the area to be cut with the ejector fully down. With the scraper in forward motion, slowly lower the bowl by moving the bowl control lever to the lowering position, then back to the holding position until the proper depth of cut is attained. Continue the cutting operation of the scraper until the bowl is filled or until the end of the cutting area has been reached.

Caution: **To ensure proper operation, check the scraper often while cutting. Watch for large stones or other objects that could damage the scraper.**

c. When the bowl is full or when the end of cutting area has been reached, move the bowl control lever to the raising position and at the same time, move the apron lift lever to the lowering position.

d. With the bowl fully raised and the apron down, move the load to the dumping area.

18. Carrying a Load
(fig. 12)

a. Move all levers to the holding position to ensure that they will not accidentally operate while the scraper is in motion.

b. Observe the loaded scraper often to be sure that it is trailing properly; stop and remedy any irregularities that arise.

19. Spreading a Load
(fig. 13)

a. Drive the scraper to the dumping area.

b. While moving forward, operate the apron lift lever to the raising position to permit the load to be ejected. Operate the ejector lift lever to the raising position to discharge the load. The depth of the spread is determined by the speed of the loader, the speed with which the ejector is raised, the height to which the apron is raised, and the height of the bowl. Vary these factors as required to regulate the depth of the spread. Move the ejector lift lever between the raising and holding positions to control the total ejection time.

c. When the dump is completed, move the ejector lift lever to the lowering position until the ejector is fully lowered. Raise the bowl high enough to permit free movement to the loading area.

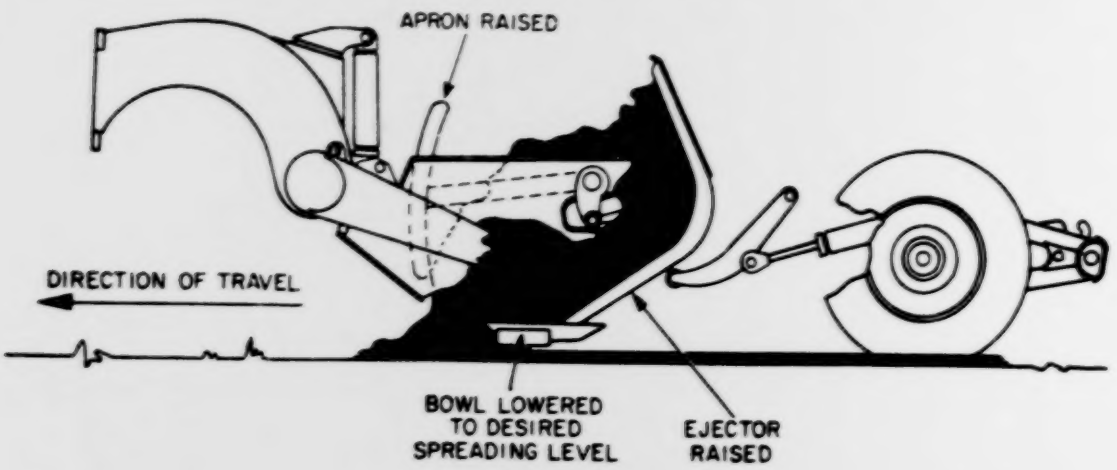


Figure 13. Spreading the load.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

20. Extreme Cold (below 0° F)

a. General. Operation of the scraper in extremely cold temperatures creates special problems and requires careful inspection and maintenance. Be especially careful not to subject the scraper to any sudden shock loads and rough handling which might strain or break the metal parts. Carefully check all cylinders, mechanical parts, and the frame for proper operation. Keep tire pressure uniform at all times. If practical, place a matting of burlap, cardboard, or a nonporous material under the tires when parking the vehicle to keep the tires from freezing to the ground and to protect them from possible damage when the scraper is moved. For protection and efficient operation of the scraper under severe cold weather conditions, carefully observe the instructions given in steps b through d below.

b. Lubrication. Make sure that the proper grade and type of lubricant is used at all application points. Refer to the lubrication order (fig. 14) for special lubrication instructions.

c. Brake System. Immediately after shutting down the scraper at any time, open the drain cock (4, figure 24) at the bottom of the air tank to prevent collected moisture from freezing in the tank.

d. Hydraulic System. Operate all cylinders very slowly several times before putting the scraper into operation to allow time for the hydraulic fluid to circulate and warm the parts.

21. Salt Water or High Humidity

a. General. Exposed metal corrodes more rapidly in high humidity or salt water areas. Coat unpainted parts with lubricating oil or preservative compound. After working in salt water, wash the scraper with fresh water.

b. Lubrication. Clean all lubrication fittings thoroughly before applying lubricant.

c. Hydraulic System. When parking the scraper for any length of time, raise the bowl all the way and block the bowl for support. This will retract the bowl control cylinder push rod all the way and protect it from salt water or rust damage. Lower the ejector and the apron all the way for the same reason.

22. Rough Terrain

Rough terrain requires slower, more cautious operation of the scraper. Special care is needed to assure that the cutting blade is not damaged by large rocks. Much closer control of the cutting and spreading operation is required because of the uneven ground level. When operating in rough terrain, it is generally advisable to make more cuts at shallow depth than a few deep cuts.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND LUBRICANTS

23. Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel for maintenance of the scraper.

24. Lubrication Information

a. General. The lubrication order (fig. 14) prescribes the lubrication maintenance of the scraper.

b. Care of Lubricants and Lubrication Equipment. Keep all lubricants in closed containers and store them in a clean, dry place away from heat. Always protect the lubricants from dust, dirt, or moisture. Keep lubrication equipment clean and ready for use at all times.

c. Points of Application. Follow the detailed lubrication instructions given in the lubrication order (fig. 14).

d. Cleaning. Use a cloth moistened with dry-cleaning solvent or diesel fuel to remove any old or hardened lubricants. After lubrication, remove any excess lubricant and wipe any spilled lubricant from parts not requiring lubrication.

LUBRICATION ORDER

LO 5-3805-231-15

SCRAPER, EARTH MOVING, TOWED: 18 CU YD STRUCK CAPACITY SCOOP; HYDRAULIC; 2 WHEELS, PNEUMATIC TIRES (EUCLID MODEL 58SH-G)

REFERENCE TM 5-3805-231-15 C 9100-SL

Intervals are based on normal hours of operations. Reduce to compensate for abnormal operations and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing or fording.

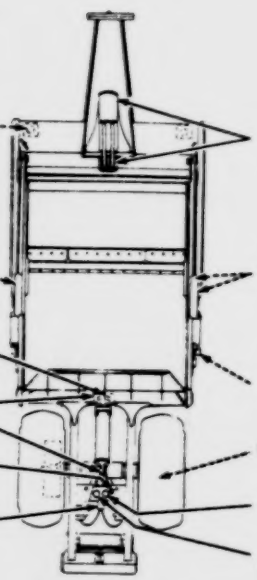
Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

FOLD

FOLD

	LUBRICANT	INTERVAL
1 Leveling Jack (Clean and coat threads and oil pivot pins with OE at time of use)	OE	
2 Apron Cylinder Pin, Rod End	GAA	10
3 Ejector Lever	GAA	10
4 Ejector cylinder pin	GAA	10
5 Brake Hydraulic Tank Level cock (See note 3)		50
6 Brake Hydraulic Tank Drain (Drain and refill) (See Note 3) Remove couplings to Drain. Install couplings before filling		1000



	INTERVAL	LUBRICANT
7 Bowl Cylinder Pin	10	GAA
8 Yoke Mounting Seat	10	GAA
9 Apron Cylinder Pin, Head End	10	GAA
10 Wheel Bearings (See note 2)	1000	GAA
11 Brake Hydraulic Tank Fill Cap (See Key) (See note 3)		OE
12 Brake Hydraulic Tank Breather (Clean and re-oil)	250	OE

MEC 3805-231-15/14 (1)

Figure 11. Lubrication order.

– KEY –

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to -10°F	0°F to -65°F	
GAA–GREASE, Automotive and Artillery		ALL TEMPERATURES			Intervals given are in hours of normal operation
OE–OIL, Engine, Heavy Duty		OE 10 or 9110	OE 10 or 9110	OES	
Brake Hydraulic Tank	4 qts				
Oil Can Points					
OES–OIL, Engine, Sub-zero					

NOTES

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F. Remove lubricants prescribed in the key for temperatures above -10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. WHEEL BEARINGS. Every 1000 service hours remove wheel, clean and replace worn parts, repack bearings and reassemble.

3. BRAKE HYDRAULIC TANK FILL, DRAIN AND LEVEL. Every 50 hours, open level cock to check for level. Fill with OE until oil flows from level cock. Close level cock. Every 1000 hours, drain and refill to level.

Copy of this Lubrication Order will remain with equipment at all times; instructions contained herein are mandatory.

BY ORDER OF SECRETARY OF THE ARMY:

EARLE G. WHEELER,
General, United States Army
Chief of Staff

OFFICIAL:

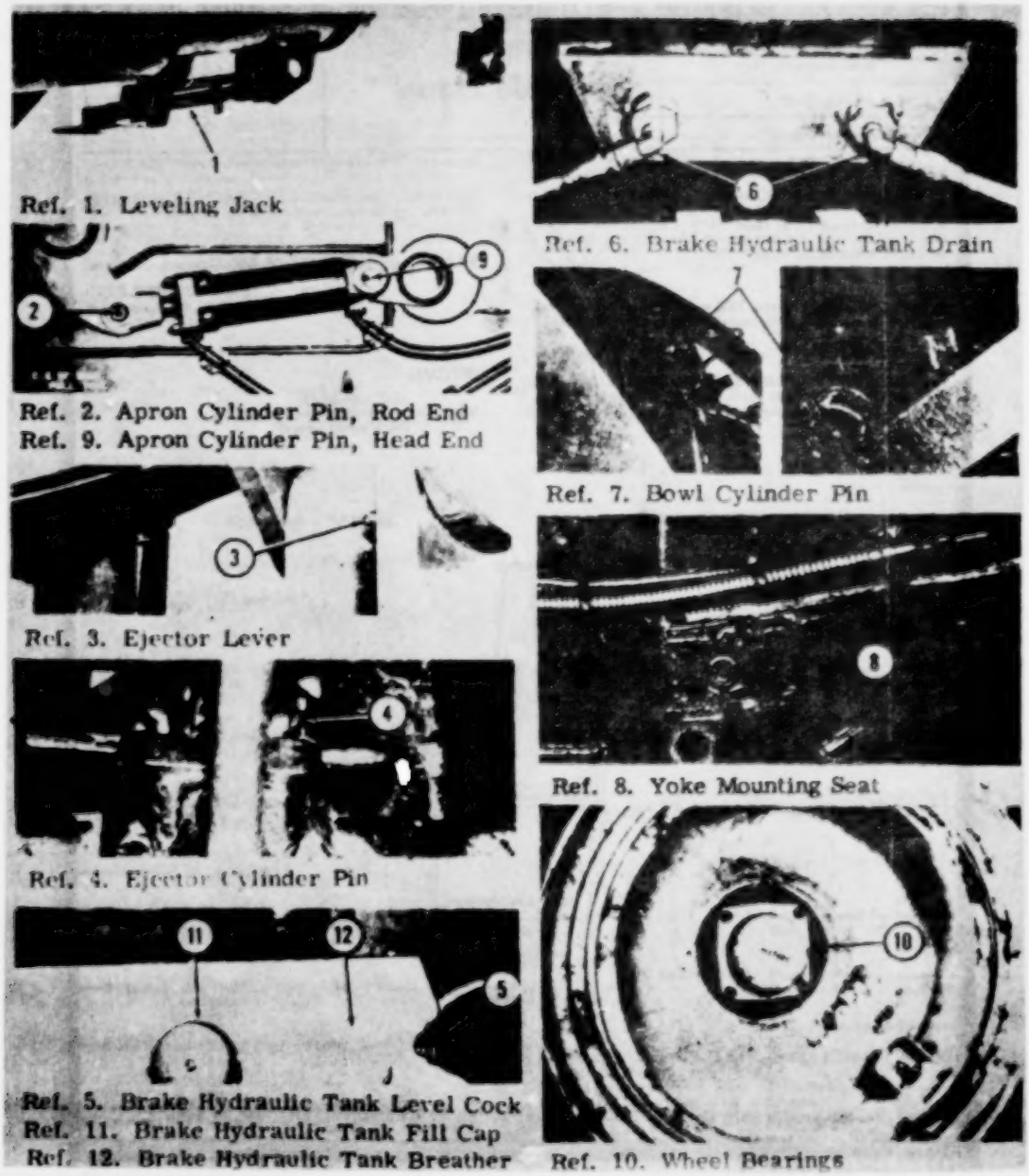
J. C. LAMBERT
Major General, United States Army
The Adjutant General

FOLD

FOLD

MEC 3805-271-15/14 (2)

Figure 14.—Continued.



MEC 3805-231-15/14 (3)

Figure 14.—Continued.

Section II. OPERATOR AND CREW PREVENTIVE MAINTENANCE

25. General

To ensure that the scraper is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraphs 26 and 27. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit should be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, with the corrective action taken, on DA Form 2404 at the earliest possible opportunity.

26. Operator's Daily Services

An illustrated tabulated listing of preventive maintenance services which must be performed daily by the operator is given in figure 15. Services shown in figure 15 constitute a minimum requirement for daily service.

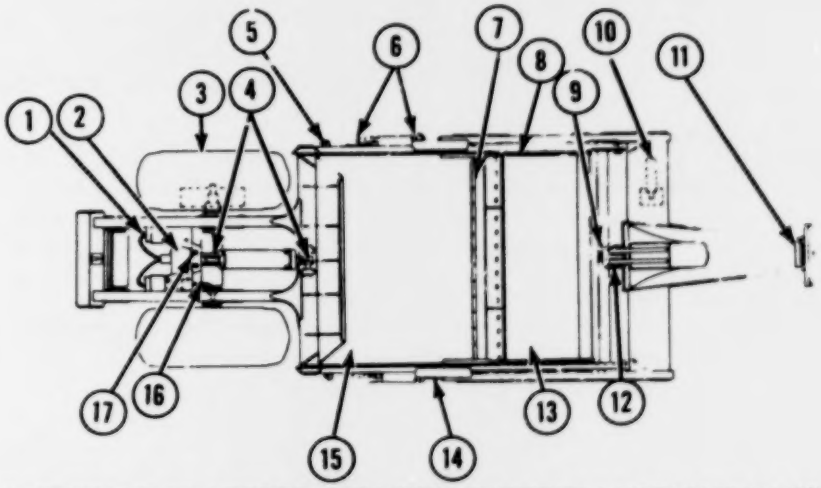
27. Quarterly Preventive Maintenance Services

An illustrated tabulated list of preventive maintenance services which must be performed quarterly by organizational maintenance personnel is given in figure 16. A quarterly interval is equivalent to 3 calendar months, or 250 hours of operation, whichever occurs first. The item numbers in figure 16 indicate the sequence of minimum requirements.

PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-3805-231-15 | EUCLID MODEL 58 SH-G | SCRAPER



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	AIR CHAMBER AIR LINES. Inspect air lines for damage and loose connections. Replace damaged lines; tighten loose connections.	49
2	AIR RESERVOIR. Open drain cock and allow all trapped moisture to drain completely. Inspect for deterioration or damage.	48
3	TIRE AIR PRESSURE. Check the air pressure to ensure that there is 45 psi in each tire.	
4	EJECTOR LIFT CYLINDER. Inspect for damaged or missing spacers, pins, lubrication fittings, bolts, and lock washers. Replace if damaged or missing. Check cylinder for leaks; correct or report to organizational maintenance.	42
5	EJECTOR LOCK PIN. Inspect for damaged or missing ejector lock pin, chain, pin, or holder. Replace if damaged or missing.	42
6	APRON LIFT CYLINDER. Inspect for damaged or missing pins, bolts, lock washer, and lubrication fittings. Replace if damaged or missing. Check cylinder for leaks; correct leaks as necessary.	43

MEC 3805-231-15/15

Figure 15. Daily preventive maintenance services.

ITEM		PAR REF
7	CUTTER BLADES. Inspect cutter blades for distortion, cracks, breaks, wear, or other damage. Replace blade if damaged. If blades are excessively worn, reverse them so that opposite cutting edge is in cutting position. If blades have already been turned, replace blade.	60
8	WEAR PLATE. Inspect wear plate for damage to leading edge. If leading edge is damaged, but not trailing edge, reverse wear plate. Replace if wear plate has already been reversed.	60
9	BOWL LOCK/QUICK DROP VALVE. Inspect bowl lock/quick drop valve for leaking fitting, breaks, cracks, or other damage. Correct leaks Report defective valve to organizational maintenance.	
10	SCRAPER JACK. Check for proper operation of scraper jack. Inspect threads for chips, cracks, or other damage. Inspect screw for distortion, breaks, or other damage. Replace defective jack.	61
11	HYDRAULIC FLUID AND AIR PRESSURE CONNECTIONS. Inspect all air and hydraulic lines and scraper connections for leaks or damage. Replace damaged lines and fittings.	45
12	BOWL CONTROL CYLINDER. Inspect spacers, pins, lubrication fittings, bolts, and lock washers for damage. Replace any damaged parts. Check cylinder for leaks. Correct leaks as necessary.	44
13	APRON. Inspect apron for distortion, breaks, or cracks. Replace defective apron.	59
14	PULL ARM SOCKET. Inspect pull arm socket for distortion, cracks, breaks, or other damage to ball, socket assembly, or lubrication fitting. Repair damage.	
15	EJECTOR. Inspect ejector for distortion, cracks, breaks, or other damage. Report damage to organizational maintenance.	72
16	BRAKE HYDRAULIC FLUID LINES. Inspect brake lines for damage and loose connections. Replace damaged lines; tighten loose connections. Open brake line bleeders to allow escape of air trapped in line.	57
17	BRAKE HYDRAULIC FLUID RESERVOIR. Open level cock to check for proper fluid level. If fluid does not flow out of cock, fill with hydraulic fluid until it does; close level cock.	56

MEC 3805-231-15/15 ②

Figure 15.—Continued.

ITEM		PAR REF
	NOTE 1. OPERATION. During operation observe for any unusual noise or vibration.	

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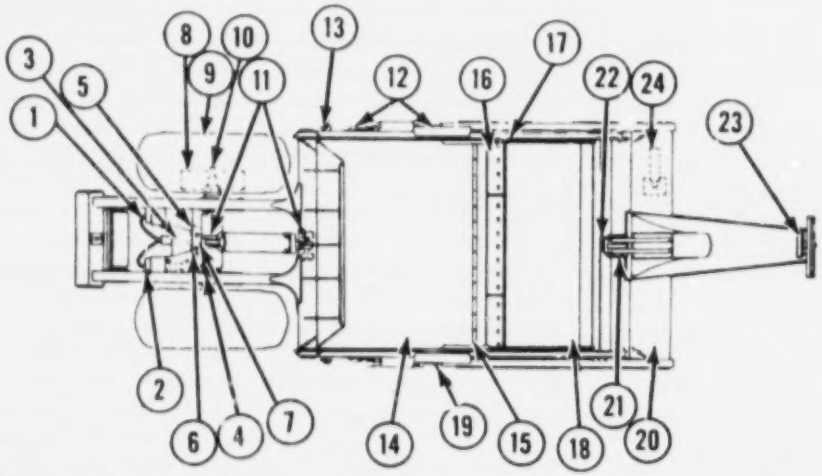
Figure 15.—Continued.

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM 5-3805-231-15 EUCLID MODEL 58 SH-G SCRAPER



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	AIR CHAMBER AIR LINES. Inspect air lines for damage and loose connections. Replace damaged lines; tighten loose connections.	49
2	AIR BRAKE CHAMBER. Check operation of air brake chamber; check for leaking air around master cylinder-brake chamber junction. Report defective air brake chamber to direct support maintenance.	54
3	AIR RESERVOIR. Open drain cock and allow all trapped moisture to drain completely. Inspect for deterioration or damage.	48
4	BRAKE HYDRAULIC FLUID LINES. Inspect brake lines for damage and loose connections. Replace damaged lines; tighten loose connections. Open brake line bleeders to allow escape of air trapped in lines.	57
5	BRAKE HYDRAULIC FLUID RESERVOIR. Open level cock to check for proper fluid level. If fluid does not flow out of cock, fill with hydraulic fluid until it does; close level cock.	56
6	BRAKE HYDRAULIC FLUID RESERVOIR BREATHER. Wash breather in approved solvent, shake out excess fluid, and reinstall on reservoir.	48

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Figure 16. Quarterly preventive maintenance services.

ITEM		PAR REF
7	BRAKE HYDRAULIC FLUID RESERVOIR FILTERS. Remove filters, wash in clean hydraulic fluid, and return to reservoir.	
8	BRAKE LINING. Check brake block travel in relation to retaining spring. If travel is excessive, replace brake blocks and other serviceable parts.	55
9	TIRE AIR PRESSURE. Check tire air pressure to ensure that there is 45 psi in each tire.	
10	WHEEL BEARINGS. Inspect wheel bearings for correct lubrication, foreign particles, obvious evidence of damage from overheating, or other damage. Service and repair as necessary.	52
11	EJECTOR LIFT CYLINDER. Inspect for damaged or missing spacers, pins, lubrication fittings, bolts, and lock washers. Replace if damaged or missing.	42
12	APRON LIFT CYLINDER. Inspect for damaged or missing pins, bolts, lock washers, and lubrication fittings. Replace if damaged or missing. Check cylinder for leaks; adjust as necessary.	43
13	EJECTOR LOCK PIN. Inspect for damaged or missing ejector lock pin, chain, pin or holder. Replace if damaged or missing.	42
14	EJECTOR. Inspect ejector for distortion, cracks, breaks, or other damage. Report any damage to direct support maintenance.	72
15	EJECTOR HINGE. Inspect ejector hinge pin for distortion, cracks, breaks, or other damage. Report damage to direct support maintenance.	
16	CUTTER BLADES. Inspect cutter blades for distortion, cracks, breaks, wear, or other damage. Replace blade if damaged. If blades are excessively worn, reverse them so that opposite cutting edge is in cutting position. If blades have already been turned, replace blade.	60
17	WEAR PLATE. Inspect wear plate for damage to leading edge. If leading edge is damaged, but not trailing edge, reverse wear plate. Replace if wear blade has already been reversed.	60
18	APRON. Inspect apron for distortion, breaks, or cracks. Replace if damaged.	59

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Figure 16.—Continued.

ITEM		PAR REF
19	PULL ARM SOCKET. Inspect pull arm socket for distortion, cracks, breaks, or other damage to ball, socket assembly, or lubrication fitting. Repair damage.	
20	TORQUE TUBE ASSEMBLY. Inspect torque tube assembly for breaks, distortion, cracked welds, or other damage. Report damage to proper authority.	
21	BOWL CONTROL CYLINDER. Inspect spacers, pins, lubrication fittings, bolts, and lock washers for damage. Replace any damaged parts. Check cylinder for leaks. Correct leaks or report to proper authority.	44
22	BOWL LOCK/QUICK DROP VALVE. Inspect bowl lock/quick drop valve for leaking fitting, breaks, cracks, or other damage. Correct leaks as necessary.	
23	HYDRAULIC FLUID AND AIR PRESSURE CONNECTIONS. Inspect all air and hydraulic lines and scraper connections for leaks or damage. Replace damaged lines and fittings.	45
24	SCRAPER JACK. Check for proper operation of scraper jack. Inspect threads for chips, cracks, or other damage. Inspect screw for distortion, breaks, or other damage. Replace defective jack.	61
	NOTE 1. OPERATIONAL TEST. During operation observe for any unusual noise or vibration.	
	NOTE 2. ADJUSTMENTS. Make all necessary adjustments during operational test.	

MEC 3805-231-15/16 ③

Figure 16.—Continued.

Section III. TROUBLESHOOTING

28. Cylinders Work Slowly at Rated Pressure

Probable Cause	*Possible Remedy*
Restricted lines and fittings.	Clean lines and fittings of restrictions.
Oil passing cylinder piston.	Replace hydraulic cylinder (para 42, 43, or 44).
Dented cylinder tube.	Replace hydraulic cylinder (para 42, 43, or 44).
Distorted piston rod.	Replace hydraulic cylinder (para 42, 43, or 44).

29. Bowl Control Cylinder Will Not Carry Rated Load

Probable Cause	*Possible Remedy*
Oil passing cylinder piston.	Replace hydraulic cylinder (para 44).
Damaged or distorted piston rod or cylinder tube.	Replace hydraulic cylinder (para 44).

30. Bowl Descends With Control Valve in Hold

Probable Cause	*Possible Remedy*
Blowby in cylinders.	Replace hydraulic cylinder (para 44).

31. Apron Descends With Control Valve in Hold

Probable Cause	*Possible Remedy*
Blowby in cylinder.	Replace hydraulic cylinder (para 43).

32. Piston Rods Leak or Cylinders Leak

Probable Cause	*Possible Remedy*
Compressed and faulty seal.	Replace hydraulic cylinder (para 42, 43, or 44).
Badly scored piston rod.	Replace hydraulic cylinder (para 42, 43, or 44).
Defective preformed packing.	Replace hydraulic cylinder (para 42, 43, or 44).
Loose end cap bolts.	Tighten bolts and nuts to correct torque value (para 66e, 67e).

33. Apron Will Not Lower

Probable Cause	*Possible Remedy*
Dirt or other foreign matter jamming mechanism.	Remove foreign matter from operating mechanism.
Distorted apron causing binding.	Replace apron (para 59).
Faulty hydraulic cylinder.	Replace hydraulic cylinder (para 43).

34. Ejector Will Not Lower

Probable Cause	*Possible Remedy*
Dirt under ejector.	Raise ejector and insert retaining pin to prevent it from lowering (para 73b (1). Remove dirt.
Distorted ejector causing binding.	Straighten ejector or report to proper authority.
Faulty ejector cylinder.	Replace ejector cylinder (para 42).

35. Cylinders Chatter When in Operation

Probable Cause	*Possible Remedy*
Air in hydraulic system.	Bleed system of air (para 45d).
Faulty seals.	Replace cylinder (para 42, 43, 44).
Dented cylinder tube.	Replace cylinder (para 42, 43, 44).
Bent piston rod.	Replace cylinder (para 42, 43, 44).

36. Brakes Dragging or Running Hot

Probable Cause	*Possible Remedy*
Air trapped in hydraulic actuating system.	Bleed brake system (para 53a).
Residual air pressure at air brake chamber.	Check operation of relay-emergency valve (para 47).
Air brake chamber retraction obstructed.	Inspect air brake chamber to ensure full retraction (para 70e).
Faulty master cylinder.	Replace master cylinder (para 70).
Broken or flattened brake retracting spring.	Refer to proper authority.
Improper fluid in system causing vaporization in brake.	Purge system; refill with hydraulic fluid as specified in lubrication order (fig. 14).

37. Brakes Will Not Apply

Probable Cause	*Possible Remedy*
Brakes not bled of air, allowing master cylinder to bottom.	Bleed brake system (para 53a).
Feed line from hydraulic fluid reservoir restricted.	Ensure free flow of fluid from reservoir.
Master cylinder power piston not retracting to seat, closing off inlet.	Replace brake actuator assembly (para 54).
Vacuum trapped in reservoir.	Open air vent in reservoir.
Insufficient fluid reserve in reservoir.	Keep reservoir filled with hydraulic fluid.
Supply line leaks.	Correct leak.
Relay-emergency valve inoperative.	Replace relay-emergency valve (para 47).

38. Brake Leaking

Probable Cause	*Possible Remedy*
Expander tube nozzle packing leaks.	Refer to proper authority.
Expander tube leaks.	Refer to proper authority.

39. Brake Hydraulic System Requires Frequent Bleeding

Probable Cause	Possible Remedy
Low level of hydraulic fluid in reservoir.	Fill reservoir with hydraulic fluid.
Defective seals on brake master cylinder.	Replace brake actuator assembly (para 54).
Loose connections in brake hydraulic lines.	Tighten all loose connections.

40. Wheels Smoking While Scraper is in Motion

Probable Cause	Possible Remedy
Brakes dragging.	Bleed brakes (para 53a).
Dry wheel bearings.	Pack wheel bearings. See lubrication order (fig. 14).

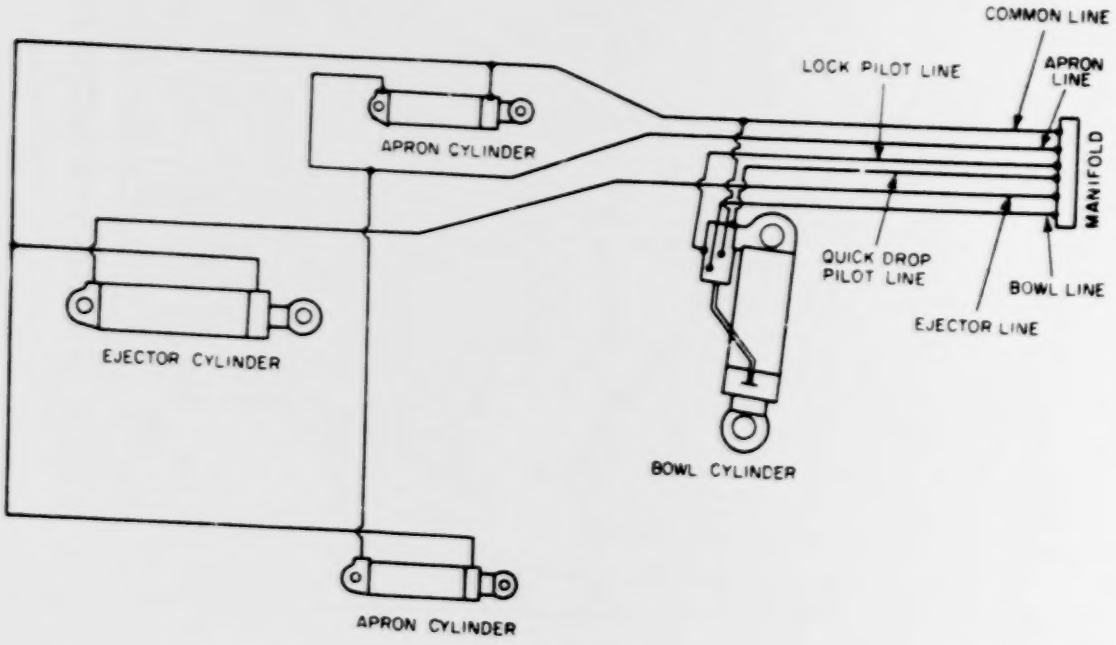
Section IV. HYDRAULIC SYSTEM

41. Description
(fig. 17)

a. The hydraulic system consists of two apron lift cylinders, one ejector lift cylinder, one bowl control cylinder, a hydraulic manifold mounted on the top of the pull yoke assembly, and the hoses, tubes, and fittings required to connect the components.

b. All hydraulic pressure and all hydraulic control is provided by components on the prime mover. Hoses from the prime mover connect to the manifold of the scraper to direct pressure to the required components on the scraper. All the hydraulic cylinders of the scraper are single-action type; that is, they apply force in one direction only. When actuated, hydraulic fluid, under pressure, is forced into the cylinder under the piston, forcing the piston and rod outward from the cylinder. The cylinder performs its required function on this outward stroke. When the pressure is released from the cylinder, the piston and rod return to the normal position by force of gravity.

c. On the power strokes, the apron lift cylinder raises the apron, the bowl control cylinder raises the bowl, and the ejector lift cylinder raises the ejector. Each of these cylinders has a



MEC 3805-231-15/17

Figure 17. Hydraulic system, schematic diagram.

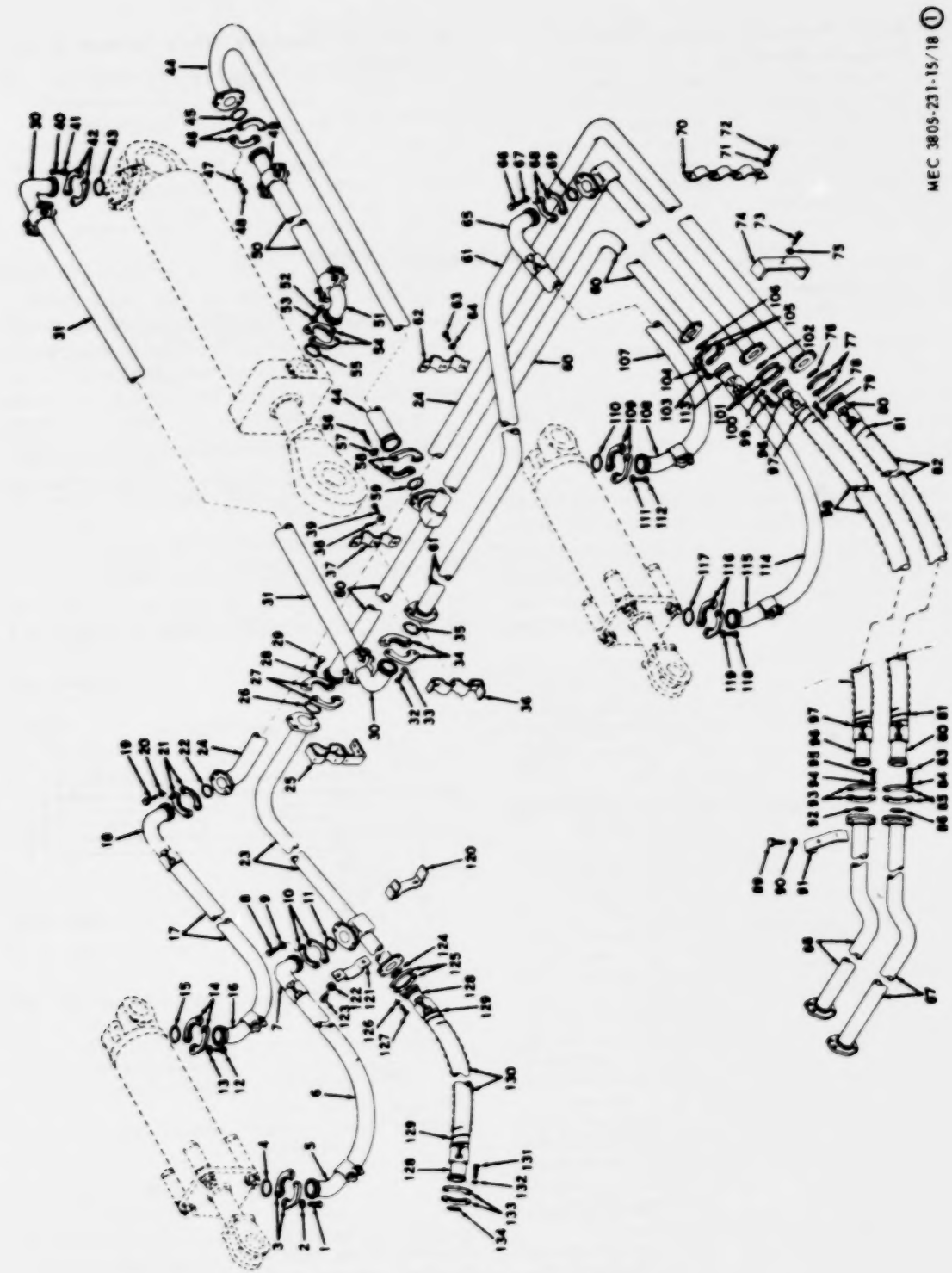


Figure 18. Hydraulic lines, exploded view.

1 Bolt
2 Lockwasher
3 Split flange
4 Preformed packing
5 Hose elbow
6 Rubber hose
7 Hose elbow
8 Bolt
9 Lockwasher
10 Split flange
11 Preformed packing
12 Bolt
13 Lockwasher
14 Split flange
15 Preformed packing
16 Hose elbow
17 Rubber hose
18 Hose elbow
19 Bolt
20 Lockwasher
21 Split flange
22 Preformed packing
23 Metal tube assembly
24 Metal tube assembly
25 Bracket
26 Preformed packing
27 Split flange
28 Lockwasher
29 Bolt
30 Hose elbow
31 Rubber hose
32 Bolt
33 Lockwasher
34 Split flange
35 Preformed packing
36 Lower clamp
37 Upper clamp
38 Lockwasher
39 Bolt
40 Bolt
41 Lockwasher
42 Split flange
43 Preformed packing
44 Metal tube assembly
45 Preformed packing
46 Split flange
47 Lockwasher
48 Bolt
49 Hose adapter
50 Rubber hose
51 Hose elbow
52 Bolt
53 Lockwasher
54 Split flange
55 Preformed packing
56 Bolt
57 Lockwasher
58 Split flange
59 Preformed packing
60 Metal tube assembly
61 Metal tube assembly
62 Clamp
63 Bolt
64 Lockwasher
65 Hose elbow
66 Bolt
67 Lockwasher
68 Split flange
69 Preformed packing
70 Upper clamp
71 Lockwasher
72 Bolt
73 Bolt
74 Bracket
75 Lockerwasher
76 Preformed packing
77 Split flange
78 Lockwasher
79 Bolt
80 Hose adapter
81 Hose protector
82 Rubber hose
83 Bolt
84 Lockwasher
85 Split flange
86 Preformed packing
87 Metal tube assembly
88 Metal tube assembly
89 Bolt
90 Lockwasher
91 Bracket
92 Preformed packing
93 Split flange
94 Lockwasher
95 Bolt
96 Hose adapter
97 Hose protector
98 Rubber hose
99 Bolt
100 Lockwasher
101 Split flange
102 Preformed packing
103 Bolt
104 Lockwasher
105 Split flange
106 Preformed packing
107 Rubber hose
108 Hose elbow
109 Split flange
110 Preformed packing
111 Lockwasher
112 Bolt
113 Hose adapter
114 Rubber hose
115 Hose elbow
116 Split flange
117 Preformed packing
118 Bolt
119 Lockwasher
120 Lower clamp
121 Upper clamp
122 Lockwasher
123 Bolt
124 Preformed packing
125 Split flange
126 Lockwasher
127 Bolt
128 Hose adapter
129 Hose protector
130 Rubber hose
131 Bolt
132 Lockwasher
133 Split flange
134 Preformed packing

Figure 18.—Continued.

connection from the piston rod end to return to the reservoir on the prime mover any oil that seeps past the piston.

d. Two hydraulic lines, in addition to the bowl line, connect from the manifold to the bowl/lock quick drop valve on the bowl control

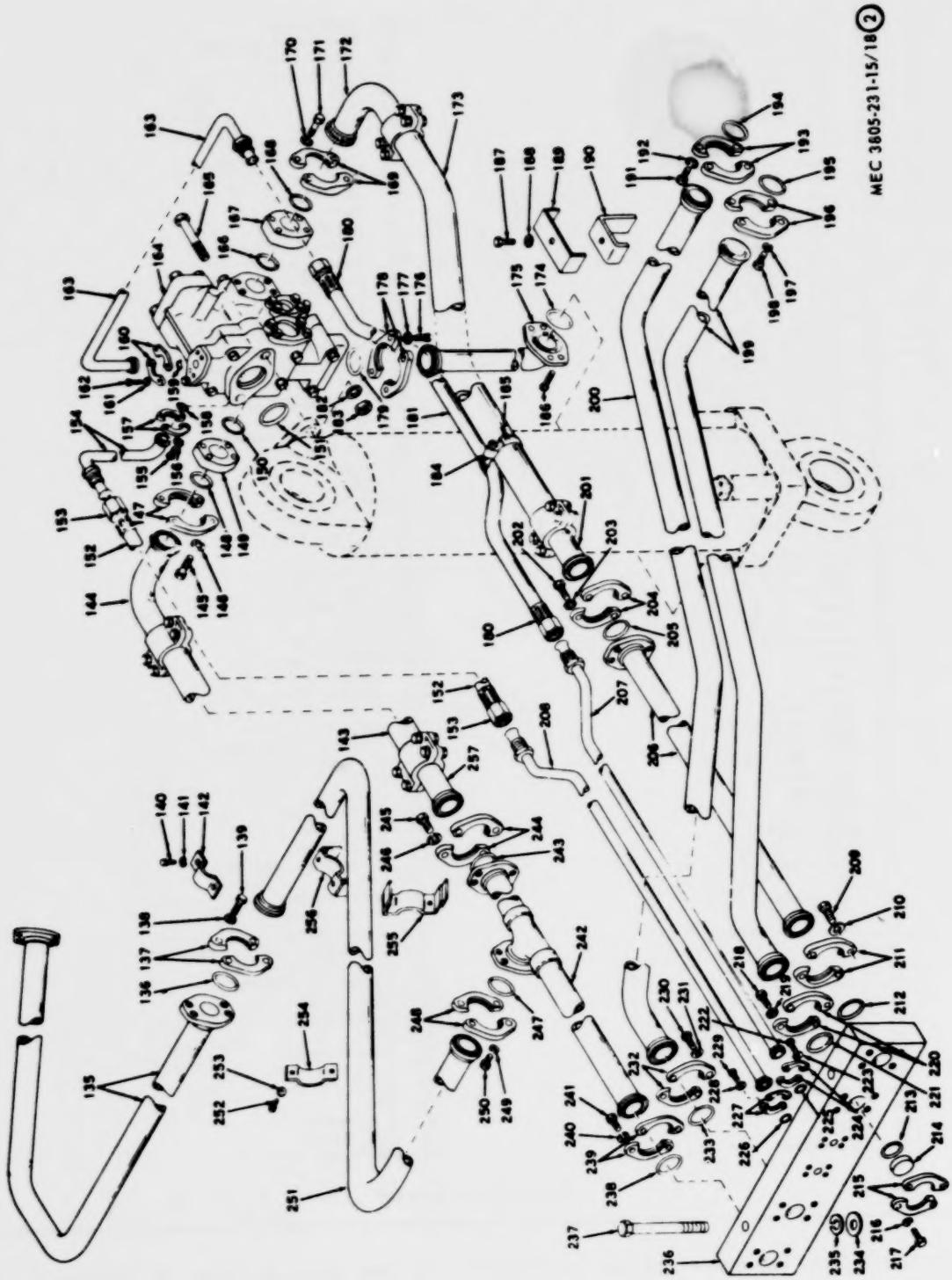


Figure 18.—Continued.

135 Metal tube assembly
136 Preformed packing
137 Split flange
138 Lockwasher
139 Bolt
140 Bolt
141 Lockwasher
142 Upper clamp
143 Rubber hose
144 Hose elbow
145 Bolt
146 Lockwasher
147 Split flange
148 Preformed packing
149 Spacer
150 Preformed packing
151 Preformed packing
152 Rubber hose
153 Hose adapter
154 Metal tube assembly
155 Bolt
156 Lockwasher
157 Split flange
158 Preformed packing
159 Preformed packing
160 Split flange
161 Lockwasher
162 Bolt
163 Metal tube assembly
164 Bowl lock/quick drop valve
165 Bolt
166 Preformed packing
167 Spacer
168 Preformed packing
169 Split flange
170 Lockwasher
171 Bolt
172 Elbow
173 Hose
174 Preformed packing
175 Metal tube assembly
176 Bolt
177 Lockwasher
178 Split flange
179 Preformed packing
180 Hose adapter
181 Hose
182 Lockwasher
183 Nut
184 Clamp
185 Loom
186 Bolt
187 Bolt
188 Lockwasher
189 Bracket
190 Bracket
191 Bolt
192 Lockwasher
193 Split flange
194 Preformed packing
195 Preformed packing
196 Split flange
197 Lockwasher
198 Bolt
199 Tube assembly
200 Tube assembly
201 Adapter
202 Bolt
203 Lockwahser
204 Split flange
205 Preformed packing
206 Tube assembly
207 Tube assembly
208 Tube assembly
209 Bolt
210 Lockwasher
211 Split flange
212 Preformed packing
213 Preformed packing
214 Plug
215 Split flange
216 Lockwasher
217 Bolt
218 Bolt
219 Lockwasher
220 Split flange
221 Preformed packing
222 Bolt
223 Lockwasher
224 Split flange
225 Preformed packing
226 Preformed packing
227 Split flange
228 Lockwasher
229 Bolt
230 Bolt
231 Lockwasher
232 Split flange
233 Preformed packing
234 Flat washer
235 Lockwasher
236 Manifold
237 Bolt
238 Preformed packing
239 Split flange
240 Lockwasher
241 Bolt
242 Tube assembly
243 Preformed packing
244 Split flange
245 Bolt
246 Lockwasher
247 Preformed packing
248 Split flange
249 Lockwasher
250 Bolt
251 Tube assembly
252 Lockwasher
253 Bolt
254 Clamp
255 Bracket
256 Bracket
257 Hose adapter

Figure 18.—Continued.

cylinder. These lines control the bowl locking and quick dropping functions of the bowl control cylinder.

42. Ejector Lift Cylinder

a. Removal.

(1) Position a container below the hydraulic line hose (50, fig. 18). Remove the bolts (52) and lock washers (53) from the halves of the split flange (54); remove the split flange. Disconnect the hose and remove the preformed packing (55). Insert the end of the hydraulic line hose (50) into the container [illegible] to drain from the ejector [illegible]

1 Ejector assembly
2 Shackle
3 Chain
4 Bushing
5 Ejector lift lever
6 Grease fitting
7 Pin assembly
8 Lockwasher
9 Bolt
10 Cover
11 Bolt
12 Flat washer
13 Lockwasher
14 Bolt
15 Tool box
16 Flat washer
17 Lockwasher
18 Nut
19 Side and tail assembly
20 Pin assembly
21 Lockwasher
22 Bolt
23 Bolt
24 Lockwasher
25 Pin assembly
26 Ejector assembly lock pin
27 Chain
28 Bushing
29 Bushing
30 Tinge pin cover plate
31 Hinge plate
32 Pull arm seat
33 Pin
34 Spirol pin
35 Pull yoke assembly
36 Bolt
37 Lockwasher
38 Pin
39 Bolt
40 Lockwasher
41 Pin
42 Bushing
43 Pin assembly
44 Roller
45 Spacer

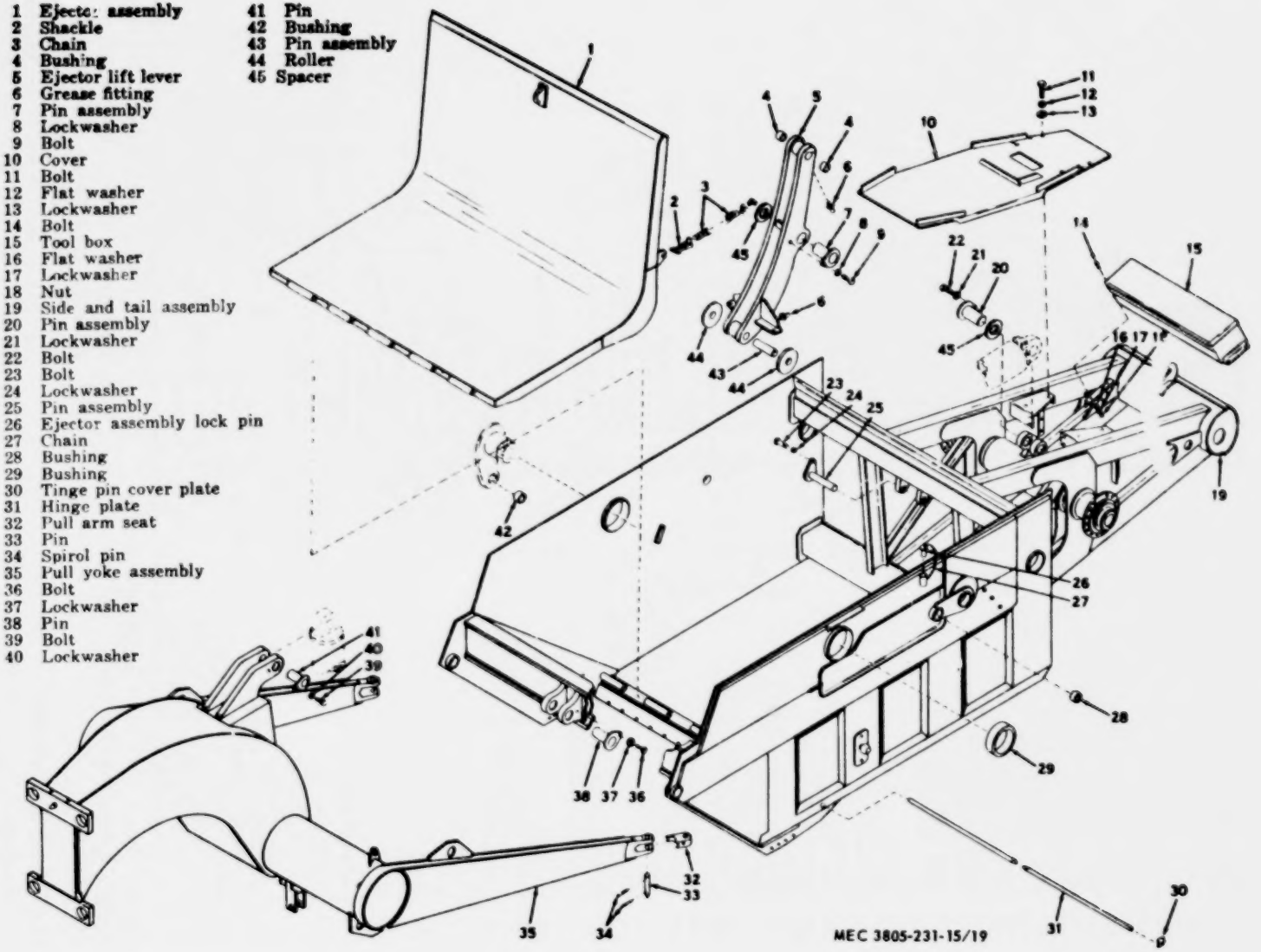


Figure 19. Pull yoke and side and tail assemblies, exploded view.

(2) Wrap a sling around the ejector lift cylinder and support the cylinder with a hoist.

Warning: **The ejector lift cylinder is very heavy. Do not attempt to remove this cylinder unless it is securely supported.**

(3) Remove the four bolts (40) and lock washers (41) from the halves of the split flange (42) that secure the hydraulic line hose (31) to the cylinder; disconnect the hose. Cover hose ends and cylinder ports to prevent dirt from entering.

(4) Remove the bolt (9, fig. 19) and lock washer (8) that secure the pin assembly (7) to the ejector lift lever (5); remove the bolt (22) and lock washer (21) that secure the pin assembly (20) to the brackets on the side and tail assembly (19).

(5) Remove the pin assembly (7) and two spacers (45) from the ejector lever end of the cylinder; lower the cylinder until it rests on the tail assembly frame.

(6) Remove the pin assembly (20) and two spacers (45) from the axle end of the ejector lift cylinder; lift the cylinder out of the scraper.

b. Cleaning and Inspection.

(1) Inspect the ejector lift cylinder for signs of leaking hydraulic fluid; replace a leaking cylinder.

(2) Clean all exterior parts of the ejector lift cylinder with a cloth dampened with cleaning solvent.

(3) Inspect for cracks, breaks, or other damage. With a hoist, extend and retract the piston and rod to check for binding. Replace if faulty.

(4) Inspect all hose connections for cracks, distortion, or damage; replace any defective part.

c. Installation. Install the ejector lift cylinder by reversing the removal procedure described in step a above.

43. Apron Lift Cylinder (fig. 20)

a. Removal.

(1) Position a container under the apron lift cylinder (6). Remove the four bolts (15 and 18) from each set of split flanges (16 and 19). Remove the split flanges and preformed packings and disconnect the hose assemblies (14 and 17) from the cylinder. Drain the hoses and cylinder into the container.

(2) Wrap a sling around the apron lift cylinder and support it with a hoist.

Warning: **The apron lift cylinder is very heavy. Do not attempt to remove it unless the cylinder is supported.**

(3) Remove the bolt (4) and lock washer (5) that secure the pin assembly (2) to the rod eye; remove the pin to release the forward end of the apron lift cylinder (6).

(4) Remove the nuts (13), lock washers (12), and bolts (10) that secure the pin (9) to the pivot bracket. Remove the pin to release the apron lift cylinder; remove the cylinder.

b. Cleaning and Inspection.

(1) Inspect the apron lift cylinder for signs of leaking hydraulic fluid; replace a leaking cylinder.

(2) Clean all exterior parts of the apron lift cylinder with a cloth dampened in dry cleaning solvent.

(3) Inspect for cracks, breaks, or other damage. Use a hoist to extend and retract the piston and rod to check for binding. Replace a damaged or improperly functioning cylinder.

(4) Inspect all hose connections for cracks, damaged threads, and distortion; replace any defective parts.

c. Installation. Install the apron lift cylinder by reversing the removal procedure described in step a above.

44. Bowl Control Cylinder

a. Removal.

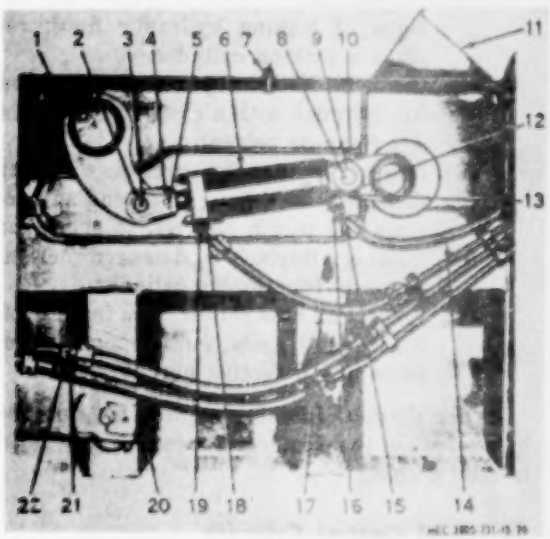
(1) Fully raise the bowl, using the bowl control cylinder. Install the bowl lock pins as directed in paragraph 10a (3) to lock the bowl in position.

(2) Remove the bolts (145, 155, 162, 171, and 176, fig. 18) and lock washers (146, 156, 161, 170, and 177) that secure the halves of the split flanges

(147, 157, 160, 169, and 178) to the bowl lock/quick drop valve (164); remove the split flanges and disconnect the elbows (144 and 172) and tubes (154, 163, and 175) and remove the preformed packings (148, 158, 159, 168, and 179). Drain the hydraulic fluid into a container. Remove the spacers (149 and 167) and preformed packings (150 and 166).

(3) Remove the two bolts (165), lock washers (182) and nuts (183) that secure the bowl lock/quick drop valve (164) to the bowl control cylinder (9, fig. 21); remove the valve and preformed packing (151, fig. 18).

(4) Wrap a sling around the bowl control cylinder (9, fig. 21) and support the cylinder with a hoist. Remove the bolt (3) and lock washer that secure the pin (4) to the bowl control cylinder bracket (2) on the pull yoke (1); remove the pin.



1	Lever arm assembly	12	Lockwasher
2	Pin assembly	13	Nut
3	Grease fitting	14	Hose assembly
4	Bolt	15	Bolt
5	Lockwasher	16	Split flange
6	Apron lift cylinder	17	Hose assembly
7	Ejector safety lock pin	18	Bolt
8	Grease fitting	19	Split flange
9	Pin	20	Pull arm assembly
10	Bolt	21	Bolt
11	Top extension	22	Split flange

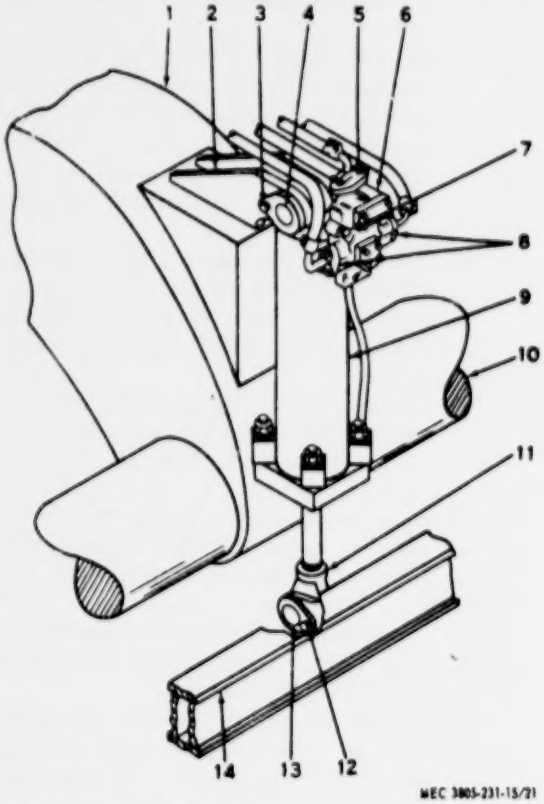
Figure 20. Apron lift cylinder installation.

(5) Remove the bolt (12) and lock washer that secure the pin (13) to the bowl bracket on the lift beam (14) of the bowl; remove the pin and remove the bowl control cylinder from the scraper.

b. Cleaning and Inspection. The cleaning and inspection procedures are the same as those for the ejector lift cylinder described in paragraph 42b.

c. Installation.

(1) Using a hoist and sling, position the bowl control cylinder (9, fig. 21) so



1	Pull yoke
2	Bowl control cylinder bracket
3	Bolt
4	Pin
5	Split flange
6	Bowl lock/quick drop valve
7	Bolt
8	Split flange
9	Bowl control cylinder
10	Torque tube
11	Rod eye
12	Bolt
13	Pin
14	Lift beam

Figure 21. Bowl control cylinder.

that the rod eye (11) is in line with the bracket on the bowl lift beam (14) and the other end of the cylinder is in line with the cylinder bracket (2) on the pull yoke (1); secure the upper end of the cylinder to the pull yoke using the pin (41, fig. 19), bolt (39), and lock washer (40).

(2) Secure the rod eye of the bowl control cylinder to the bowl lift beam with the pin (38), bolt (36), and lock washer (37).

(3) Secure the preformed packing (151, fig. 18) and bowl lock/quick drop valve (164) to the bowl control cylinder, using the two bolts (165), lock washers (182), and nuts (183). Position the preformed packings (150 and 166) and spacers (149 and 167) on the valve as shown in figure 18. Connect the elbows (144 and 172), tubes (154, 163, and 175), and preformed packings (148, 158, 159, 168, and 179) to the valve, using the split flanges (147, 157, 160, 169, and 178), bolts (145, 155, 162, 171, and 176) and lock washers (146, 156, 161, 170, and 177).

(4) Raise and lower the bowl several times to ensure a good connection.

Warning: **All personnel must stand clear while the connection is being tested.**

45. Hydraulic Lines and Manifold

a. Removal. To remove the hydraulic lines, position a container of sufficient capacity to hold the hydraulic fluid and remove the bolts, lock washers, and split flanges that secure the lines; disconnect the lines and remove the preformed packings. To remove the manifold (236), disconnect all connections and remove the two bolts (237), lock washers (235), and flat washers (234) that secure the manifold to the goose neck; remove the manifold.

b. Cleaning and Inspection.

(1) Discard all preformed packings removed during the removal procedure.

(2) Clean the hydraulic lines with approved solvent; inspect the lines for breaks, cracks, distortions, deterioration of rubber parts, or other damage. Replace any damaged lines.

(3) Inspect the fittings for damage to the preformed packing seats, cracks, or breaks. Replace any damaged fitting.

c. Installation. Install the hydraulic lines and manifold by reversing the removal procedure described in step a above.

d. Bleed Hydraulic System. Since the cylinder hydraulic system is connected to the hydraulic system of the prime mover, operate the unit to bleed the system.

Section V. AIR SYSTEM

46. Description
(fig. 22)

Air pressure from the prime mover is used on the scraper to provide power to the brake system. Air is directed to the air brake chambers (1) through couplings, lines, and fittings. The air brake chamber converts this energy of compressed air to the mechanical force necessary to operate the brake master cylinder (3). Connected in the line before the air reaches the brake chambers are a relay-emergency valve (10) and an air reservoir (9). The relay-emergency valve speeds up application and release of the brakes and automatically applies the brakes if the scraper breaks away. The air reservoir acts as a trap in the line for water and as an emergency air supply to set the brakes in the event of a scraper breakaway.

47. Relay-Emergency Valve

a. Operational Inspection.

(1) Coat the exhaust ports (2, fig. 23) with soap suds while the brakes are in the released position, applied position, and emergency position; the bubble should not grow larger than 3 inches in 3 seconds; replace the valve if leakage is too great.

(2) With the air reservoir (1, fig. 24) pressurized, disconnect the emergency air hose (8, fig. 25) at the coupling; cover the emergency supply connection with soap suds and determine the leakage; replace the valve if leakage is excessive.

b. Removal.

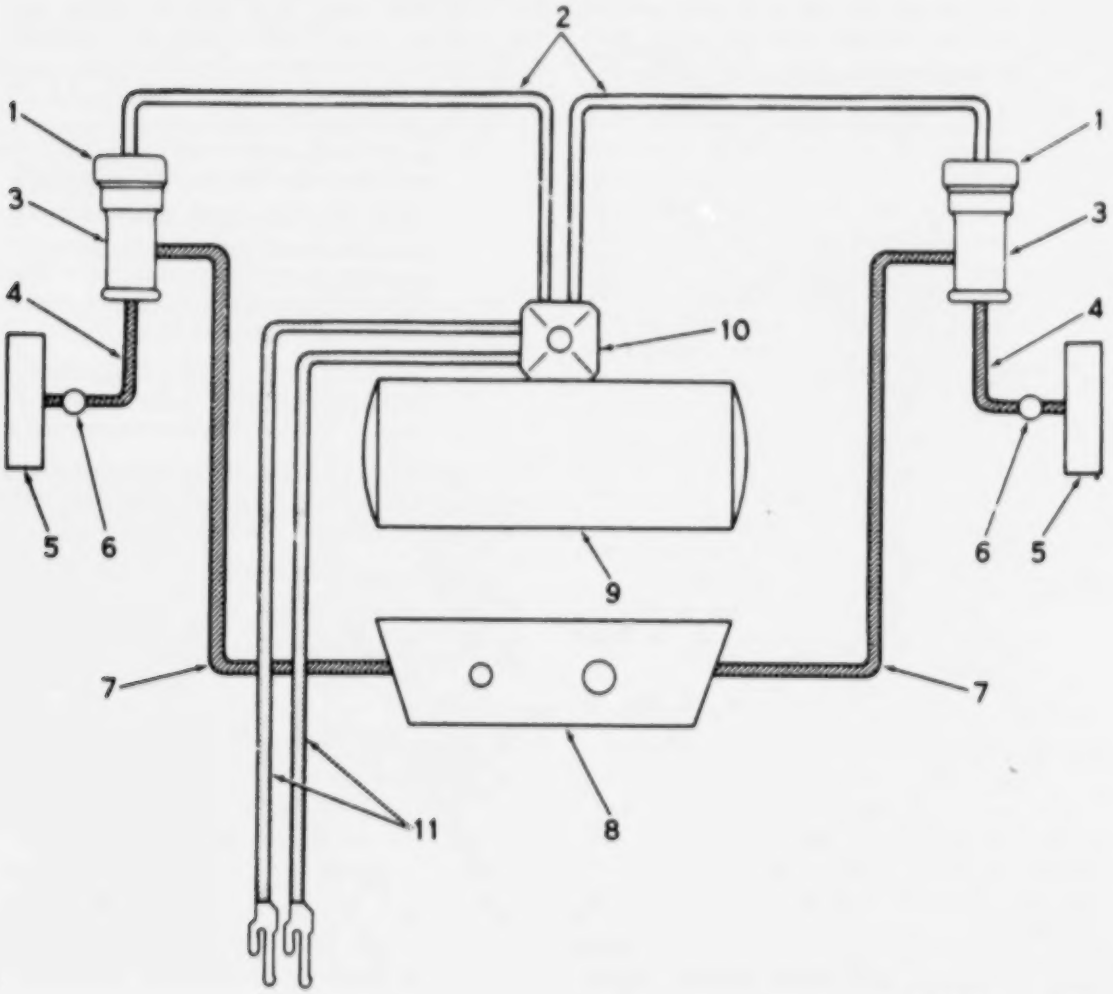
(1) Open the drain cock (4, fig. 24) on the brake air reservoir and drain all air pressure.

(2) Remove the two brake chamber hoses (12, fig. 25), the service air hose (7), and the emergency air hose (8).

(3) Remove the three mounting bolts (18) and lock washers; remove the relay-emergency valve (13) from the brake air reservoir (1); cover all open lines to prevent entry of dirt particles.

c. Cleaning and Inspection.

(1) Wipe all exterior parts with a clean,



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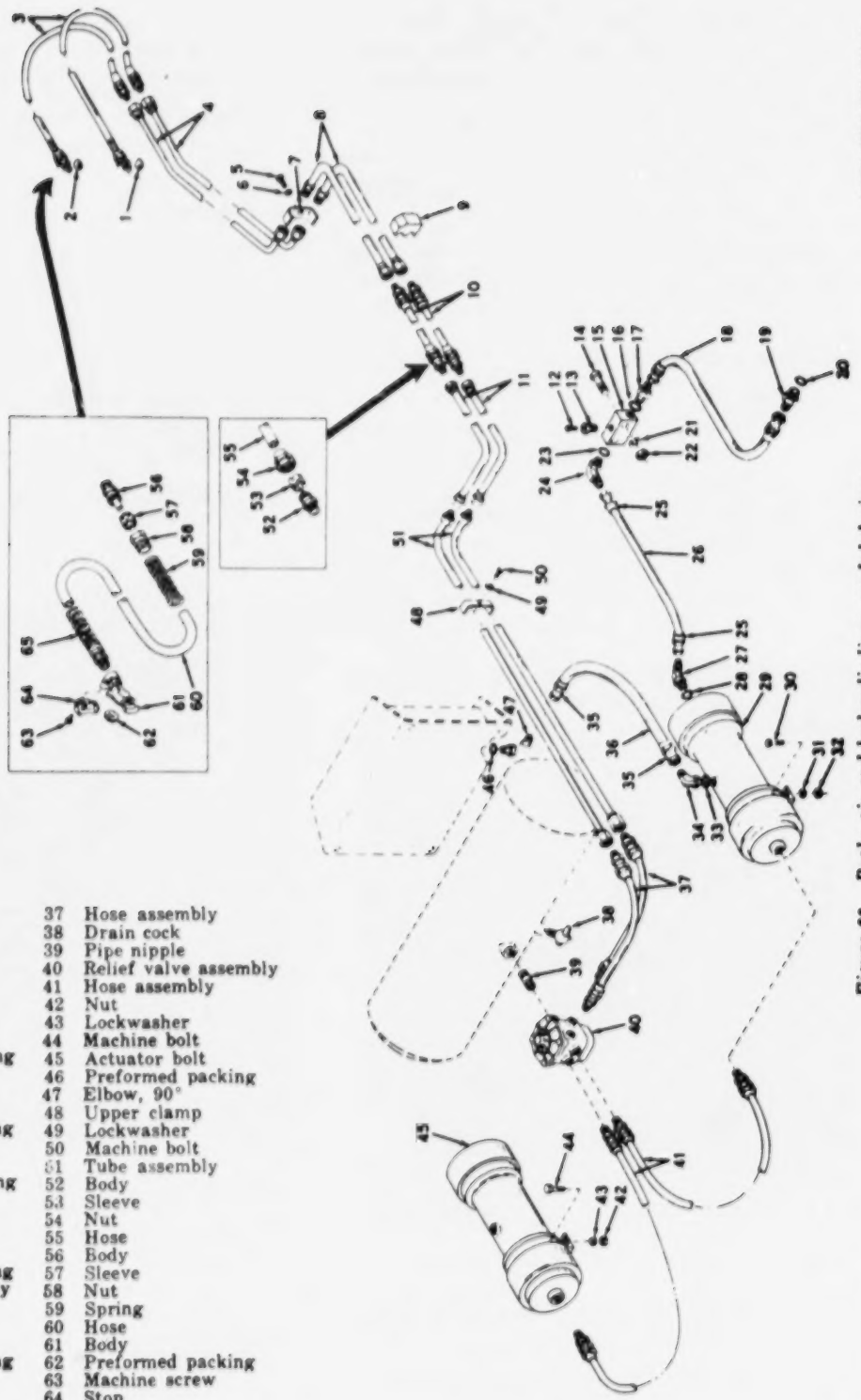
1 Air brake chamber
2 Relay-emergency valve-to-brake chamber hose
3 Brake master cylinder
4 Brake master cylinder-to-expander tube line
5 Expander tube line
6 Bleeder valve
7 Hydraulic fluid reservoir-to-brake master cylinder line
8 Hydraulic fluid reservoir
9 Air reservoir
10 Relay-emergency valve
11 Air supply line

Figure 22. Brake air and hydraulic system, schematic diagram.



1 Service tag
2 Emergency tag
3 Hose assembly
4 Tube assembly
5 Machine bolt
6 Lockwasher
7 Upper clamp
8 Tube assembly
9 Tube block
10 Hose assembly
11 Tube assembly
12 Screw
13 Bleeder valve
14 Machine bolt
15 Junction block
16 Preformed packing
17 Adapter
18 Tube assembly
19 Adapter
20 Preformed packing
21 Lockwasher
22 Nut
23 Preformed packing
24 Elbow
25 Hose coupling
26 Hose
27 Elbow 45°
28 Preformed packing
29 Actuator assembly
30 Machine bolt
31 Lockwasher
32 Nut
33 Preformed packing
34 Elbow 90°
35 Hose coupling
36 Hose
37 Hose assembly
38 Drain cock
39 Pipe nipple
40 Relief valve assembly
41 Hose assembly
42 Nut
43 Lockwasher
44 Machine bolt
45 Actuator bolt
46 Preformed packing
47 Elbow, 90°
48 Upper clamp
49 Lockwasher
50 Machine bolt
51 Tube assembly
52 Body
53 Sleeve
54 Nut
55 Hose
56 Body
57 Sleeve
58 Nut
59 Spring
60 Hose
61 Body
62 Preformed packing
63 Machine screw
64 Stop
65 Adapter

Figure 23. Brake air and hydraulic lines, exploded view.

lint-free cloth dampened with approved cleaning solvent and inspect for cracks, breaks, or other damage; replace a damaged valve.

(2) Inspect all fittings and connections for scoring, chips, or other minor damage; repair damaged valve connections and fittings.

d. Installation. Install the relay-emergency valve by reversing the removal procedure described in step b above; charge the air system.

48. Brake Air Reservoir

a. Removal.

(1) Open the drain cock (4, fig. 24) and allow all air pressure to drain off the system.

(2) Remove the relay-emergency valve as directed in paragraph 47b.

(3) Remove the four nuts (17, fig. 25) and four lock washers (16) that secure the U-bolts (15); remove the brake air reservoir (1). Cover all open lines to prevent entry of dirt.

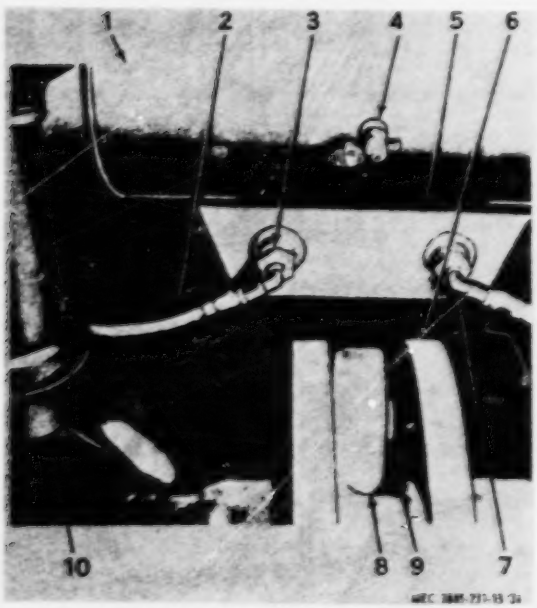
b. Disassembly. Remove the drain cock (38, fig. 23) and pipe nipple (39) from the air reservoir.

c. Cleaning and Inspection.

(1) Clean all exterior surfaces with a cloth dampened in dry cleaning solvent. Pour solvent into the reservoir and agitate to remove dirt and oil.

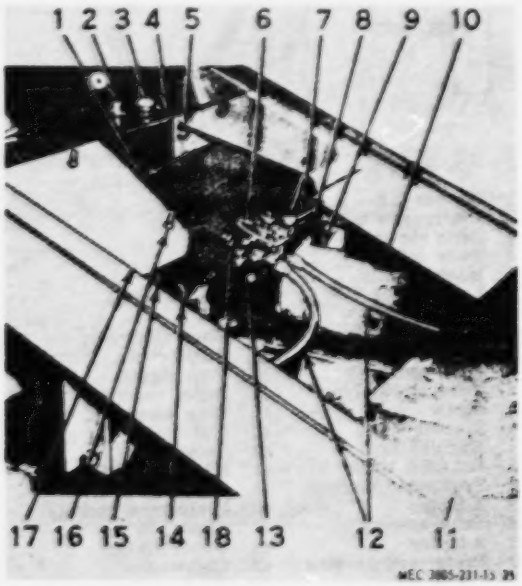
(2) Inspect the reservoir for cracks, breaks, or other damage; repair minor damage. Replace the reservoir if badly damaged.

(3) Touch up or repaint the reservoir if necessary.



1 Air brake reservoir
2 Hose
3 Screen assembly
4 Drain cock
5 Hydraulic fluid reservoir
6 Cylinder mounting bracket
7 Hydraulic fluid elbow
8 Bowl lift cylinder rod end
9 Spacer
10 Brake actuator

Figure 24. Brake air and hydraulic reservoirs bottom view.



1 Brake air reservoir
2 Pipe cap
3 Breather
4 Brake hydraulic fluid reservoir
5 Bolt
6 Bolt
7 Service air hose
8 Emergency air hose
9 Brake master cylinder
10 Air brake chamber
11 Tool box
12 Brake chamber hose
13 Relay-emergency valve
14 Brake master cylinder hose
15 U-bolt
16 Lockwasher
17 Nut
18 Bolt

Figure 25. Rear view of scraper showing brake components.

d. Reassembly. Install the pipe nipple (39, fig. 23) and drain cock (38) in the air reservoir.

e. Installation. Install the brake air reservoir by reversing the removal procedure described in step a above.

49. Air System Lines, Hoses, and Fittings (fig. 23)

a. Removal.

(1) Open the drain cock (38) and allow all air pressure to drain off the system.

(2) Disconnect hoses, tubes, and fittings as shown in figure 23. Remove clamps (7 and 48) and tube block (9) as necessary. Remove preformed packings from fittings.

(3) Disassemble hose couplings as shown in the inserts of figure 23 if necessary.

(4) Cover all openings to prevent dirt from entering the air system.

b. Cleaning and Inspection.

(1) Wipe all hoses, fittings, and lines with a clean cloth dampened in dry cleaning solvent; dry thoroughly.

(2) Inspect the lines and fittings for cracks, breaks, damaged threads, or other damage; replace any damaged parts.

(3) Inspect the hoses for damaged threads, cracks, breaks, deterioration of rubber, or other damage; replace damaged parts.

c. Installation. Install the lines, hoses, and fittings by reversing the removal procedure described in step a above.

Section VI. WHEELS AND BRAKES

50. Description

a. Tires. The tires are pneumatic, tubeless, traction-tread, 29.5 in. by 29 in., 28 ply that mount on the wheel assembly. They are held in place by a bead seat band, lock ring, flange, and a preformed packing.

b. Wheel Assemblies. Each wheel assembly is composed of a wheel hub and rim base, welded together, a valve assembly, a valve guard and bearings. The brake drum is bolted to the wheel assembly and is removed when the wheel assembly is removed.

c. Brakes (fig. 22). The brake system of the scraper is a combination air and hydraulic type. The brake assemblies are 360-degree segmented shoe types, actuated by an internal circular expander tube (5) that forces the brake blocks radially outward against the brake drum. The brake blocks are floated between side frames and prevented from rotational movement by torque bars. The brakes are pneumatically actuated from the prime mover through air supply lines (11) and an air brake chamber (1) for each brake assembly. The air brake chamber activates a hydraulic brake master cylinder (3) that supplies fluid to the expander tube (5) under pressure; the expander tube forces the brake blocks radially against the brake drum supplying the braking force. The brakes on the scraper are automatically set by the relay-emergency valve (10) in the event of a breakaway or air failure on the prime mover. The brakes are also set when the scraper is disconnected from the prime mover in a normal operation and remain set until air reservoir pressure is dissipated or pneumatic lines are reconnected.

51. Tires (fig. 26)

a. Removal.

(1) Set the parking brakes if the scraper is connected to the prime mover. If the scraper is not connected to the prime mover, block the wheel that is not to be removed.

(2) Jack up the scraper until the wheel to be removed is about 2 inches off the ground.

(3) Release all air pressure from the tire.

(4) Using a pry bar placed in the bead seat band (8), pry the tire back until the driver (5) can be removed.

(5) Pry the lock ring (1) from the wheel assembly (7) and remove the flange bead seat band (8) and preformed packing from the wheel assembly; slide the tire (4) off the wheel assembly (7); slide the inside flange off the wheel assembly.

Warning: **Stand to one side while removing the lock ring as personal injury may result if the lock ring springs out suddenly.**

b. Cleaning and Inspection.

(1) Wipe all dirt, grease, or mud from the exterior of the tire and inspect for bad cuts, abrasions, or cracks. Remove all stones or other foreign objects from the treads.

(2) Wipe the interior of the tire with a damp cloth and inspect for sharp objects, cuts, or ruptured cords.

(3) Inspect the tire bead for a good air seal. Check the air valve (6) for distortion and for proper operation.

(4) Replace defective parts.

c. Installation. Install the tire by reversing the removal procedure described in step a above.

52. Wheel Bearings

a. Removal.

(1) Remove the tires, flange (4, fig. 27), bead seat band (16), preformed packing (15), lock ring (14), and driver (26) as described in paragraph 51a.

(2) Remove the four bolts (7), and lock washers (8) that secure the hub cap (6) to the wheel assembly (24); remove the hub cap and gasket (9).

(3) Remove the cotter pin (5) from the axle nut (10). *Bolt the spanner wrench (4, fig. 28) to the wheel, using the hub bolt holes, with two bolts (2) and lock washers (3); the formed angle in the wrench will fit the wheel nut (1). Use the wheel (5) to turn off the axle nut (10, fig. 27). Remove the washers (11). Remove the bolts, lock washers, and spanner wrench.

(4) Replace the two hub cap bolts (7) diagonally across from one another on the wheel assembly; turn these bolts part of the way in.

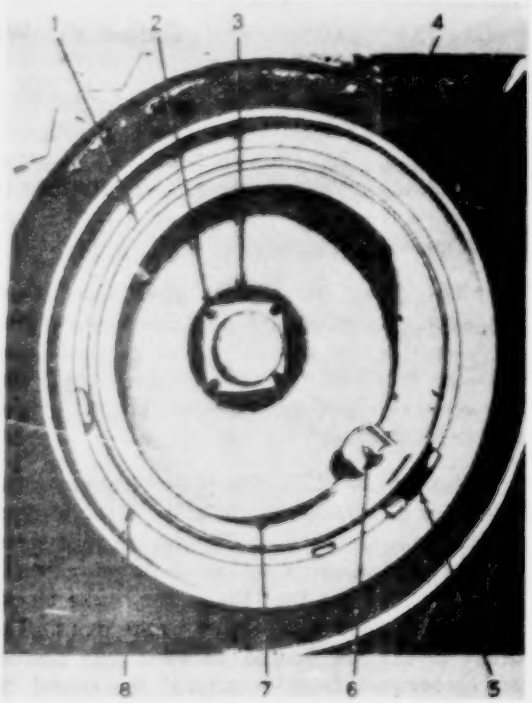
(5) Position a wheel puller equipped with lugs that fit under the bolts and pull off the wheel assembly. Remove the cone and roller (12) from the bearing cup (13) in the wheel assembly.

(6) Insert a drift pin through the cutout provided in the wheel assembly (24); tap the bearing cups (23 and 13) out of the wheel assembly.

(7) Remove cone and roller (22) from the stub axle (3).

b. Cleaning and Inspection.

(1) Clean the bearings by immersing them in an approved cleaning solvent. Use a soft-bristle brush to remove hardened or caked grease. Dry with clean,



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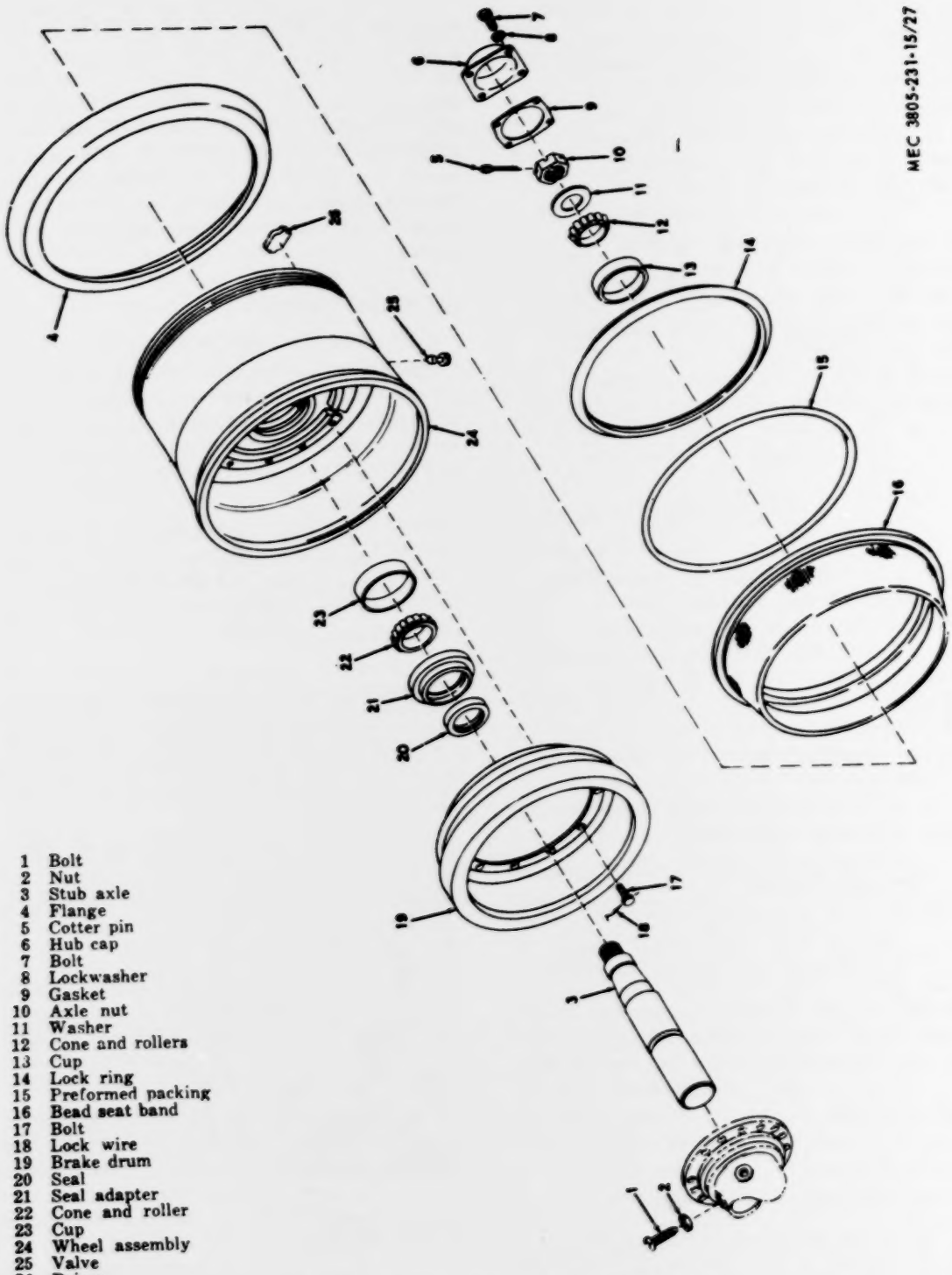
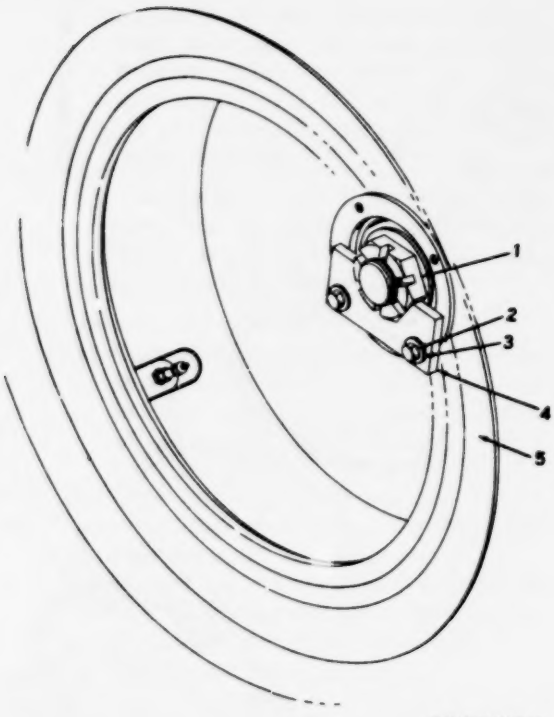
1 Lock ring
2 Bolt
3 Hub cap
4 Tire
5 Driver
6 Air valve
7 Wheel assembly
8 Bead seat band

Figure 26. Wheel and tire installation.



1 Bolt
2 Nut
3 Stub axle
4 Flange
5 Cotter pin
6 Hub cap
7 Bolt
8 Lockwasher
9 Gasket
10 Axle nut
11 Washer
12 Cone and rollers
13 Cup
14 Lock ring
15 Preformed packing
16 Bead seat band
17 Bolt
18 Lock wire
19 Brake drum
20 Seal
21 Seal adapter
22 Cone and roller
23 Cup
24 Wheel assembly
25 Valve
26 Driver

Figure 27. Wheel bearings and axle, exploded view.



1 Wheel nut
2 Bolt
3 Washer
4 Spanner wrench
5 Wheel

Figure 28. Wheel nut removal.

compresed air. Immerse the bearings in clean engine oil.

(2) Wipe all parts of the wheel assembly with a clean cloth dampened with cleaning solvent; remove all old grease and wipe clean; inspect all parts for cracks, breaks, or distortion.

(3) Inspect bearing cones for rough, catching operation, scored or galled rollers or races, cracks, or other damage. Inspect the bearing cups for scored, galled, or chipped race surfaces, cracks, distortion, or other damage.

(4) Replace defective parts.

(5) Pack the bearings with grease as directed in the lubrication order (fig. 14).

c. Installation. Install the wheel bearings by reversing the removal procedure given in step a above. Tighten the wheel bearing nut (10, fig. 27) while rotating the wheel until the bearings start to bind. Back off the nut until the side or bottom bearing rollers do not rotate. Rotate the wheel and tighten the nut until all rollers rotate. Make a rolling torque check. Tighten the nut until a rolling torque of 20 to 50 foot-pounds is attained. Install the cotter pin (5).

53. Bruke System

a. Bleeding Procedure.

Note. The scraper must be connected to the prime mover to bleed the brake system.

(1) Fill the brake hydraulic fluid reservoir (4, fig. 25) with hydraulic fluid as specified in the lubrication order (fig. 14).

***Caution:* Do not fill the brake system with automotive brake fluid. This type of fluid is especially destructive to the brake assemblies and brake master cylinders.**

(2) While operating the scraper brake valve on the prime mover, open the bleeder valve (13, fig. 23) to vent air from the brake master cylinder (3, fig. 22). When nothing flows from the bleeder, close the bleeder and release the brake.

(3) Wait 2 minutes to permit the brake master cylinder to fill; then check and refill the brake hydraulic fluid reservoir.

(4) Repeat (2) and (3) above.

(5) Actuate and hold the brake valve on the prime mover for 10 seconds with the bleeder closed; then release. Wait 2 minutes, refill the brake hydraulic fluid reservoir, and repeat this step.

(6) Repeat (2) and (3) above to clear air from the brake side of the automatic adjuster in the brake master cylinder (3) and from the expander tube (5). Repeat until no air can be detected escaping from the bleeder.

Note. Wait 2 minutes after each brake release before making the next application.

(7) Repeat (5) above enough times to ensure that the brake shoes are contacting the brake drum. Test by holding against engine power.

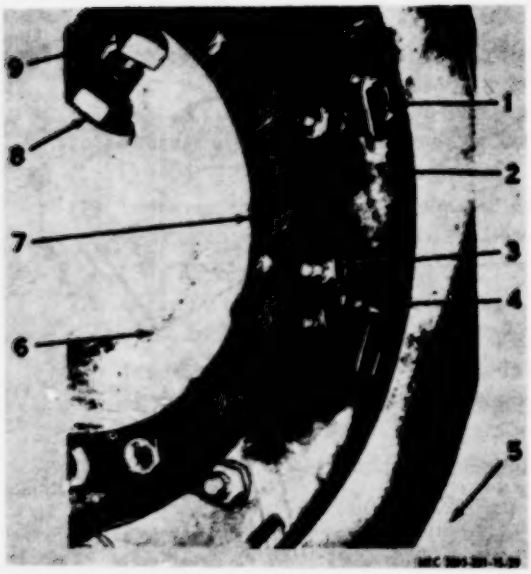
(8) Remove to the bleeder for the other brake assembly and repeat the above procedure.

(9) After operating the scraper for approximately 1 hour, open the bleeders, with the brakes released, to release any remaining air which may work to the top of the system during use.

b. Operational Inspection.

(1) Inspect daily to ensure that the brake assembly mounting bolts and nuts (7, fig. 29) have not loosened; torque to 270 foot-pounds (dry) if loose. Check that there are no broken retracting springs (1).

(2) At the end of each working shift, open the bleeder valve (13, fig. 23) at each wheel to allow trapped air and vaporized fluid to escape. Check for overheated brake drums.



1 Retracting spring
2 Brake assembly
3 Self-locking nut
4 Expander assembly
5 Wheel assembly
6 Axle housing
7 Brake assembly mounting bolt and nut
8 Nut
9 Bolt

Figure 29. Axle housing and wheel assembly.

(3) Inspect weekly for lining wear. To inspect for wear, apply the brakes and visually inspect the retracting spring (1, fig. 29) on the inside of the brake assembly (2). If the brake shoes tend to shear the retracting springs at a point between the frame and shoes, travel is at a maximum and brake blocks must be replaced.

Caution: **Continued operation of the scraper in this condition will result in damage to the brake structure.**

(4) Inspect weekly for dirt or stones between the expander tube (4), and brake assembly (2). If excess dirt is found that would impair the operation of the brakes, refer to the proper authority.

54. Brake Actuator Assembly

a. Removal.

(1) Place a container capable of holding at least 1 gallon under the brake master cylinder (9, fig. 25) of the brake actuator assembly (29, fig. 23) and disconnect the assembled hydraulic fluid hose (36) and couplings (35) from the 90° elbow (34) from the brake actuator assembly. Allow the reservoir to drain; cover the open line to prevent entry of dirt.

(2) Place the container under the brake actuator assembly-to-expander tube hose (26); disconnect and drain the line. Cover the open line to prevent entry of dirt.

(3) Open the drain cock (38) and drain the air reservoir. Disconnect the relay-emergency valve-to-brake chamber hose (41) from the air brake chamber (10, fig. 25) of the actuator assembly (29, fig. 23).

(4) Remove the two bolts (30), nuts (32), and lock washers (31) that secure each brake actuator assembly (29) to the scraper frame; remove the actuator assembly.

(5) Remove the elbows (27 and 34) and preformed packings (28 and 33) from the actuator assembly.

b. Cleaning and Inspection.

(1) Wipe the brake actuator assembly with a clean cloth dampened in dry cleaning fluid; dry thoroughly.

(2) Inspect the actuator assembly for cracks, breaks, or other damage; replace a damaged master cylinder.

(3) Check the brake actuator assembly for any indications of hydraulic fluid leaks. Apply low-pressure compressed air to the air brake chamber and check for air leaks with a soap bubble solution. Replace a leaking master actuator assembly.

c. Installation.

(1) Install the brake actuator assembly by reversing the removal procedure described in step a above.

(2) Bleed the brake system as directed in paragraph 53a.

(3) After assembly, carefully check the brake system for leaks. Repair any leaks in the tubing, hoses, or fittings

55. Brake Assembly

a. Removal.

(1) Remove the wheel assembly as directed in paragraph 52a.

(2) Support the brake assembly (2, fig. 29) and remove the brake assembly mounting bolts and nuts (7) that mount the brake assembly to the axle housing (6); disconnect the junction block-to-expander tube hose (18, fig. 23) from straight adapter (19) in the brake inlet connection. Remove the brake and drain the system as directed in paragraph 54a.

b. Cleaning and Inspection.

(1) Wipe all metal parts with a clean cloth dampened in dry cleaning solvent; dry thoroughly. Wire-brush the brake blocks.

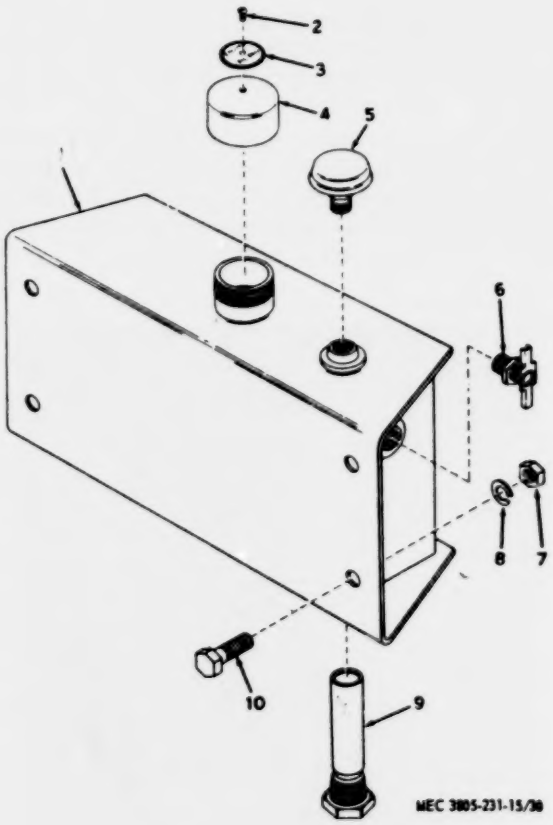
***Caution:* Do not use dry cleaning solvent on the expander tube as it will cause deterioration of the rubber.**

(2) Using low-pressure compressed air, remove all dirt particles from between the expander tube, frames, brake blocks, and torque plate.

(3) Inspect the brake assembly for distortion, breaks in the frames, fluid leakage from the expander tube or inlet connection, or other damage. Replace a damaged brake assembly.

c. Installation.

(1) Position the brake assembly on the axle and secure with the brake assembly mounting bolts and nuts (7, fig. 29); torque the bolts to 270 foot-pounds (dry).



1 Brake hydraulic fluid reservoir
2 Screw
3 Tag
4 Pipe cap
5 Breather
6 Level cock
7 Nut
8 Lockwasher
9 Filter
10 Bolt

Figure 30. Brake hydraulic fluid reservoir, exploded view.

(2) Install the wheel assembly as directed in paragraph 52c.

56. Brake Hydraulic Fluid Reservoir

a. Removal and Disassembly.

(1) Position a container under the brake hydraulic fluid reservoir (5, fig. 24). Disconnect the hydraulic fluid reservoir-to-brake actuator assembly, assembled hoses (36, fig. 23) and couplings (35) from the elbows (47) on the reservoir. Allow the hoses and reservoir to drain.

(2) Remove the elbow (47) and preformed packing (46) from the reservoir.

(3) Remove the four bolts (10, fig. 30), nuts (7), and lock washers (8) that secure the reservoir (1) to the scraper frame; remove the reservoir.

(4) Remove the pipe cap (4), breather (5), level cock (6), and filter (9) from the reservoir.

(5) Remove the screw (2) securing the tag (3) to the pipe cap; remove the tag.

b. Cleaning and Inspection.

(1) Clean the brake hydraulic fluid reservoir with an approved cleaning solvent. Pour solvent into the reservoir and agitate to remove all sludge from the interior.

(2) Immerse the breather in solvent and agitate to remove dust and dirt. Shake out excess solvent.

(3) Clean all other parts with cleaning solvent; dry thoroughly.

(4) Inspect the reservoir for cracks, damaged threads, and distortion; replace a damaged reservoir.

(5) Replace the breather if it is clogged.

(6) Replace the filter if the screen is clogged, broken, or badly distorted.

c. Reassembly and Installation.

(1) Reassemble and install the brake hydraulic fluid filter by reversing the removal and disassembly procedure described in step a above.

(2) Open the level cock (6, fig. 30) and remove the pipe cap (4). Fill the reservoir with the fluid specified in the lubrication order (fig. 14) until it starts to flow from the level cock.

(3) Bleed the brake system as directed in paragraph 53*a*.

57. Brake Hydraulic Hoses and Fittings

a. Removal.

(1) Drain the brake hydraulic lines as described in paragraph 54*a*(1).

(2) Remove the hydraulic hoses, connections, and fittings as shown in figure 23. Remove the preformed packings from the fittings.

(3) Remove the two bolts (14), lock washers (21) and nuts (22) that secure each junction block (15) to the side rail of the tail; remove the junction blocks.

(4) Remove the bleeder valves (13) from the junction block (15). Remove the screw (12) from the bleeder valve.

(5) Cover all openings to prevent dirt from entering.

b. Cleaning and Inspection.

(1) Wipe all hoses and fittings with a clean cloth dampened in cleaning solvent; dry thoroughly.

(2) Inspect the hoses and fittings for cracks, breaks, damaged threads, or other damage; repair parts with minor damage; replace seriously damaged parts.

(3) Open the bleeder valve and blow compressed air through it. If the bleeder valve is plugged and cannot be cleared, replace it with a new valve.

c. Installation.

(1) Install the hoses and fittings by reversing the removal procedure described in step a above.

(2) Bleed the brake ssytem as directed in paragraph 53a.

Section VII. APRON, CUTTER BLADES, PULL YOKE JACKS, AND TOOL BOX

58. Description

a. The apron (1, fig. 1) is provided at the front of the scraper side and tail assembly (7) to compact and retain the load. It is raised and lowered by operation of the apron lift cylinder (9) through the apron lift lever (8), which engages the arms of the apron.

b. Cutter blades and wear plates are provided at points of maximum wear on the bowl. These easily replaced parts are reversible to double the life of the part.

c. Pull yoke jacks (6) are provided under the torque tube of the pull yoke (4). These support the pull yoke when the scraper is not connected to the prime mover. They also provide a means of raising or lowering the pull yoke to permit alinement with the prime mover during connection operations.

d. The tool box (7, fig. 2) is bolted to the side and tail assembly (1). It is used to retain the tools assigned to the unit and to store the attaching parts when the unit is not connected to the prime mover.

59. Apron Assembly

a. Removal.

(1) Disconnect the apron lift cylinder push rod by removing the bolt (4, fig. 20) and lockwasher (5) from the pin assembly (2); support the apron lift cylinder (6) and remove the pin assembly. Lower the cylinder until the push rod eye is clear of the apron lift lever arm assembly (1).

(2) Remove the bolts (3, fig. 31) and lock washers (2) that secure the retaining plate (1); remove the retaining plate.

(3) Use a hoist to support the weight of the apron. Using a hammer and a block of wood, drive the apron lift lever (5) out of the side assembly Lift out the apron assembly.

b. Cleaning and Inspection.

(1) Clean the apron with a low-pressure water stream. Steam-clean if necessary to remove oily or gummy deposits.

(2) Clean apron lift lever and lever pin with a cloth dampened in dry cleaning solvent; dry thoroughly.

(3) Inspect the apron for cracks, distortion, worn edges, or other damage. Remove dents with a hammer. Paint the apron assembly if necessary. Replace a badly damaged apron assembly.

(4) Inspect the lever for cracks, breaks, distortion, or chipped splines. Replace a defective apron lift lever.

(5) Inspect the apron lift bushings in the side assembly for wear or severe scoring. If damaged, refer to the proper authority.

c. Installation. To install the apron lift lever, reverse the removal procedure described in *a* above.

60. Cutter Blades and Wear Plates

a. Removal.

(1) Raise the bowl of the side and tail assembly until the hole in the bowl locking bracket (5, fig. 7) is in line with the bowl locking hole in the tube (8) of the side assembly of the bowl (2). Drive the bowl locking pin (4) into the hole through the bracket; secure the pin with a bolt (1), lock washer (7), and nut (6).

(2) Raise the apron (4, fig. 31) and place a ½-inch bolt through the locking hole (A) on each side of the arm of the apron; lower the apron until the bolts stop it.

(3) Remove the nuts (9) and plow bolts (12) that secure the cutter blade (10) and two cutter blades (11) to the bowl of the side and tail assembly; remove the cutter blades.

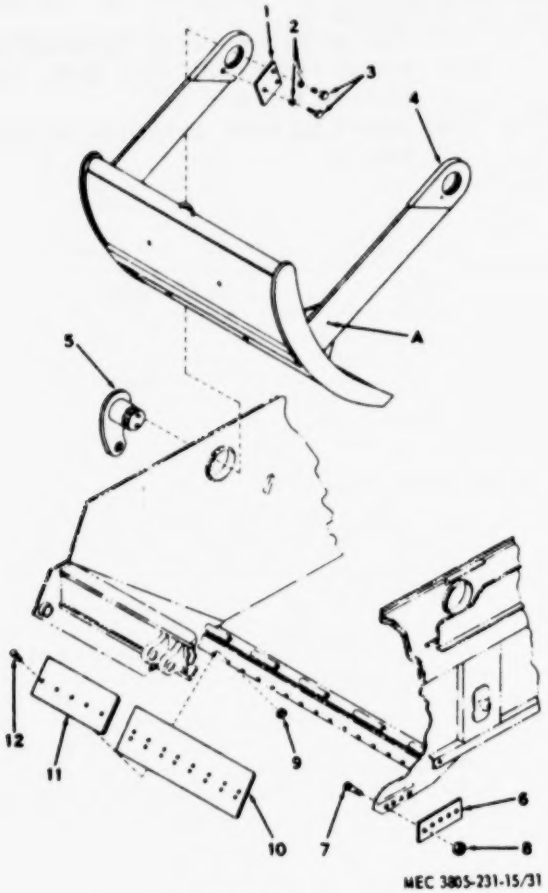
(4) Remove the nuts (8) and plow bolts (7) that secure each of the wear plates (6) to the bowl; remove the wear plates.

b. Cleaning and Inspection.

(1) Clean the wear plates and cutter blades with a low-pressure water

stream. Steam-clean if necessary to remove oily and gummy deposits. Remove rust with a wire brush.

(2) Inspect the blades for distortion, worn cutting edges, cracks, nicks that could affect scraper performance, or other damage. Grind off minor nicks. If one cutting edge is worn, retain the blade or plate and reverse it at reassembly to use the unworn edge. If the blade or plate is worn on both edges, distorted, or cracked, replace the part.



1 Retaining plate
2 Lockwasher
3 Bolt
4 Apron assembly
5 Apron lift lever
6 Wear plate
7 Plow bole
8 Nut
9 Nut
10 Cutter blade
11 Cutter blade
12 Plow bolt
A Locking hole

Figure 31. Apron, cutter blades, and wear plates, exploded view.

c. Reassembly. Reassemble by reversing the removal procedure described in step a above. Torque the cutter blade nuts to 860 to 945 foot-pounds. Torque the wear plate nuts to 637 to 703 foot-pounds.

61. Pull Yoke Jack

a. Removal.

(1) If the scraper is not connected to the prime mover, block up under the torque tube on the side of the pull yoke from which the jack will be removed.

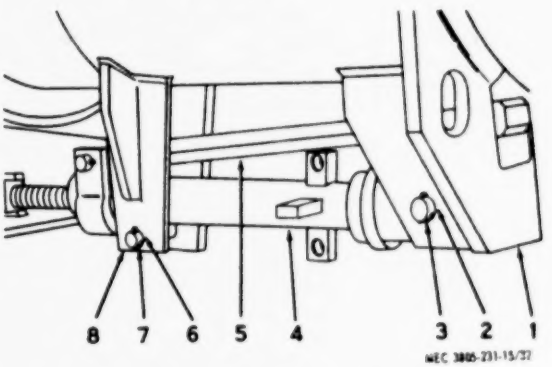
(2) Remove the cotter pins (7) and the strut pin (6) that secure the jack assembly (4) to the strut bracket (8). Swing the jack down and allow the strut (5) to fall free.

(3) Remove the cotter pin (3) and mounting pin (2) that secure the jack assembly to the jack bracket (1); remove the jack assembly.

b. Cleaning and Inspection.

(1) Clean the exterior of the jack with a cloth dampened with an approved cleaning solvent; dry thoroughly. Turn out the screw fully and clean all hardened grease from the screw with a bristle brush and solvent. Dry thoroughly and coat the screw lightly with engine oil.

(2) Inspect the exterior the jack for cracks, distortion, or other damage.



1 Jack bracket
2 Mounting pin
3 Cotter pin
4 Jack assembly
5 Strut
6 Strut pin
7 Cotter pin
8 Strut bracket

Figure 32. Pull yoke jack in raised position.

With the screw fully extended, check for worn, chipped, or distorted threads. Check the operation of the screw. It should not catch or bind through its full operating length. Replace a damaged jack.

(3) Inspect all other parts for cracks or distortion; replace damaged parts.

c. Installation. Install the pull yoke jack by reversing the removal procedure described in step a above. Grease the screw as directed in the lubrication order (fig. 14).

62. Tool Box

a. Removal.

(1) Open the tool box (15) and remove all tools, parts, and publications.

(2) Remove the four nuts (18), lock washers (17), flat washers (16), and bolts (14) that secure the tool box to the side and tail assembly (19); remove the tool box.

b. Cleaning and Inspection.

(1) Wipe the interior and exterior of the tool box with a cloth dampened in dry cleaning solvent; dry thoroughly.

(2) Inspect the tool box for breaks, cracks, distortion to the hinge, or other damage; replace a damaged tool box.

c. Installation.

(1) Position the tool box on the mounting plates; secure with four bolts, lock washers, and nuts.

(2) Return all tools, parts, and publications.

CHAPTER 4

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. OVERHAUL AND REPLACEMENT STANDARDS

Component	Desired clearance		Allowable wear and clearance	Manufacturer's dimensions and tolerances in inches	
	Min (in.)	Max (in.)		Min	Max
Apron lift cylinder					
Rod pin (9212276)				2.492	2.500
Rod pin bushing (ID)				2.507	2.512
Rod pin to bushing clearance	0.007	0.020	0.060		
Base pin				2.492	2.500
Base pin bushing (ID)				2.507	2.512
Base pin to bushing clearance	0.007	0.020	0.060		
Piston rod				2.497	2.499
Piston rod bushing (ID)				2.502	2.504
Piston rod to bushing clearance	0.003	0.007	0.010		
Bowl control cylinder					
Pins (rod and base)			0.003	3.4987	3.4995
Piston rod				2.996	2.999
Piston rod bushing				3.001	3.003
Piston rod to bushing clearance	0.002	0.007	0.010		
Ejector lift cylinder					
Pins (rod and base)			0.003	3.4981	3.4995
Piston rod				2.996	2.999
Piston rod bushing				3.001	3.003
Piston rod to bushing clearance	0.002	0.007	0.010		
Support rings			0.002	0.120	0.125

Component	Desired clearance		Allowable wear and clearance	Manufacturer's dimensions and tolerances in inches	
	Min (in.)	Max (in.)		Min	Max
Apron lift lever					
Lever shaft				6.828	6.833
Lever shaft bushing (ID)				6.838	6.840
Lever shaft to bushing clearance	0.005	0.012	125		
Ejector lever					
Bushing (ID)				2.507	2.512
Pin				2.497	2.500
Lever bushing to pin clearance	0.007	0.015	0.060		

Section II. GENERAL SERVICING AND REPAIR INSTRUCTIONS

63. Bearings

a. General. The bearings provided in the rod eyes of the bowl control and ejector lift cylinders are of a spherical type in which an inner race slides across the face of a stationary outer race on a thin layer of lubricant. The outer race is held stationary by two setscrews, and the inner race has a loose fit on the pin that mounts the cylinders.

b. Removal. Remove the two setscrews (1, figure 33) from the cylinder eye. Remove the spherical bearings (5) by tapping against the outer race (2) with a drift pin and light hammer.

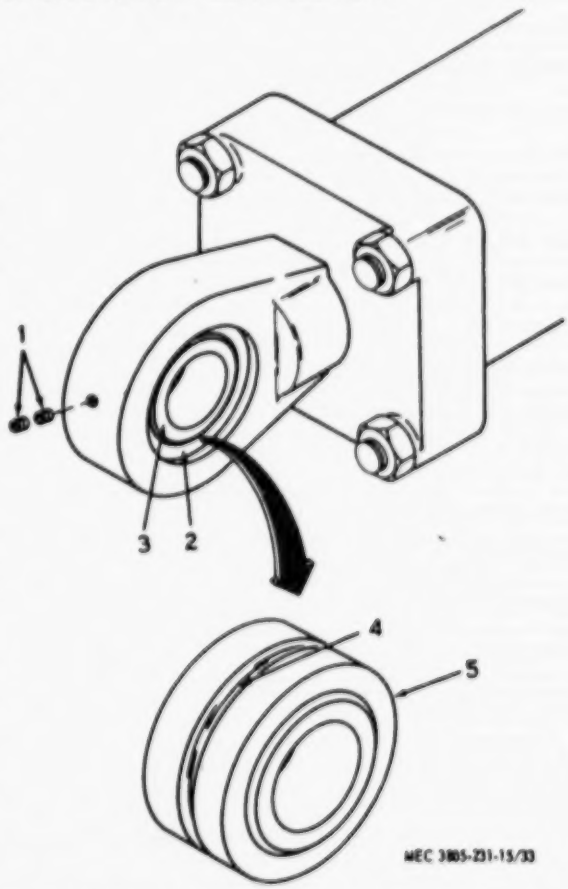
c. Inspection and Repair.

(1) Clean the bearing with a cloth dampened in dry cleaning solvent; dry thoroughly using filtered compressed air. Lubricate with engine oil.

(2) Check the operation of the spherical bearing; it must turn freely with no drag or hesitation.

(3) Insert a thin wire into the grease port in the inner race and clean out any congealed grease.

d. Installation. Insert the spherical bearing into the cylinder eye and lock in place with setscrews (1). Be sure the setscrew seats in the groove (4) provided in the outer race of the bearing.



1 Setscrew
2 Outer race
3 Inner race
4 Groove
5 Spherical bearing

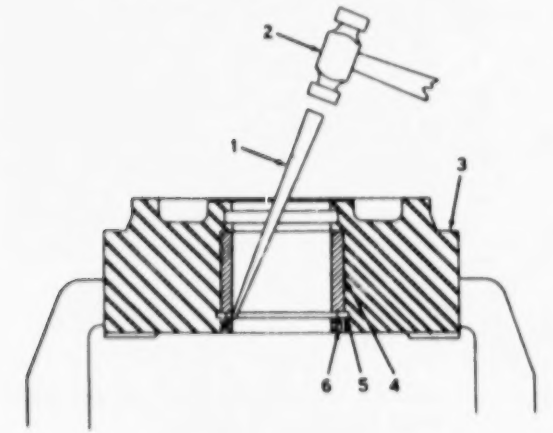
Figure 33. Bearing removal.

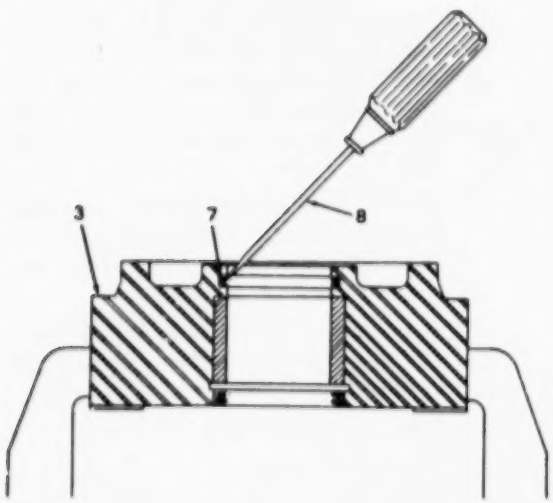
64. Seals

a. Removal.

(1) To remove the wiper seals of the hydraulic cylinders, secure the cylinder end cap (3, fig. 34) inside up in a vise. Drive the wiper seal (6) out of the end cap using a long drift pin (1).

Caution: **Do not ride on the edge of the bushing with the drift pin while removing the wiper seal. This will damage the bushing and replacement will then be necessary.**





MEC 3805-231-15/34

1 Drift pin
2 Hammer
3 End cap
4 Bushing
5 Retaining pin
6 Wiper seal
7 Rod seal
8 Screwdriver

Figure 34. Seal removal.

(2) To remove the rod seal (7), lay the end cap inside up on a bench. Place a thin screwdriver (8) between the retaining ring and the edge of the slot and pry out the two retaining rings. Pry out the rubber seal.

b. Cleaning and Inspection.

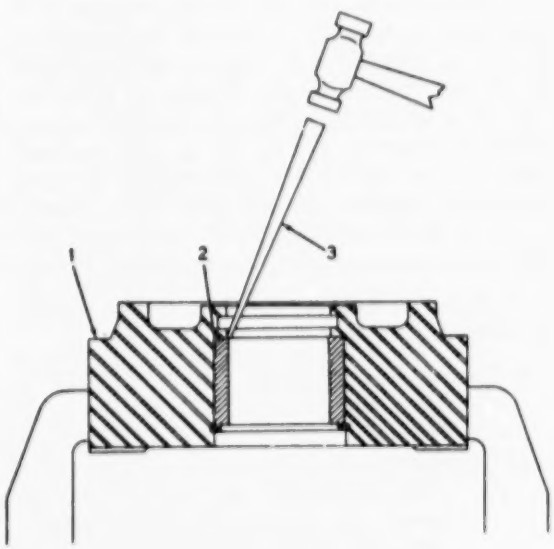
(1) Using a sharp-edged tool, carefully remove any particles of dirt, rubber, or thickened oil from the seal mounting positions in the end cap.

(2) Inspect the end cap for damage inflicted while removing the seals; repair any damage.

c. Installation.

(1) To install the wiper seal, lay the end cap outside up on a bench, position the wiper seal on the end cap, and using a rubber mallet, drive it into position by striking diagonally opposite points near the outside edge of the wiper seal until firmly seated.

(2) To install the rod seals, lay the end cap inside up on a bench and work the



MEC 3805-231-15/35

1 End cap 2 Bushing 3 Drift pin

Figure 35. Typical bushing removal.

rubber seal into the slot provided, position a retaining ring in the end cap and slide it into the slot on top of the rubber seal; repeat the procedure with the other retaining ring.

65. Bushings

a. Removal. Do not remove bushings unless they are worn or scored and need replacement.

(1) To remove rod bushings (2, fig. 35) secure the end cap outside up in a vise and remove the retaining ring holding the bushing in place; turn the end cap over in the vise and tap the bushing out using a drift pin and light hammer.

(2) To remove the cylinder base bushings or lever bushings, drive them out using a piece of metal stock that fits over the bushing without riding on the mounting parts.

(3) To remove the apron lift lever bushings, drive them out using a heavy hammer and a piece of wood that fits over both edges of the bushing.

b. Inspection. Inspect the bushing for excessive wear, scoring, burrs, or other damage; replace a damaged bushing.

c. Installation.

(1) To install rod bushings, secure the end cap outside up in a vise and seat the rod bushing until it rests on the flange; install the retaining ring to lock the bushing in place.

(2) To install the cylinder base bushings or lever bushings, position the bushing on its mounting part and drive it in flush using a block of soft wood and a light hammer.

(3) To install the apron lift lever bushings, position the bushing on the mounting hole in the side assembly and drive it in flush using a hammer and block of soft wood.

Section III. HYDRAULIC SYSTEM

66. Ejector Lift Cylinder

a. Description. The ejector lift cylinder is a single-acting hydraulic cylinder that converts hydraulic pressure into mechanical movement to lift the ejector of the scraper to eject the load. It is anchored on the side and tail assembly of the scraper. The end of its push rod connects to the ejector lift lever which, in turn, moves the ejector. The cylinder has a return port that allows hydraulic fluid that seeps past the piston to be returned to the prime mover.

b. Removal. Remove the ejector lift cylinder as directed in paragraph 42a.

c. Disassembly (fig. 36).

(1) Turn the rod eye (13) off the push rod (18).

(2) Remove the four self-locking nuts (15), bolts (22) and pads (23) that secure the end cap (7) to the cylinder (3); slide the end cap off the push rod (18). Remove the preformed packing (16).

(3) Pull the push rod (18) out of the cylinder (3) and remove the nut (4) that secures the piston (21) to the push rod; remove the piston.

(4) Remove the wiper seal (12), retaining ring (11), and rod seal (17) from the end cap (7) as directed in paragraph 64a. Remove the bushing (10) from the end cap as directed in paragraph 65a.

(5) Remove the support rings (5), preformed packing (20), and seal (6) from the piston (21). Discard the preformed packing and seal.

(6) Remove the spherical bearings from the rod eye and base eye as directed in paragraph 63b.

c. Cleaning and Inspection.

(1) Discard all seals.

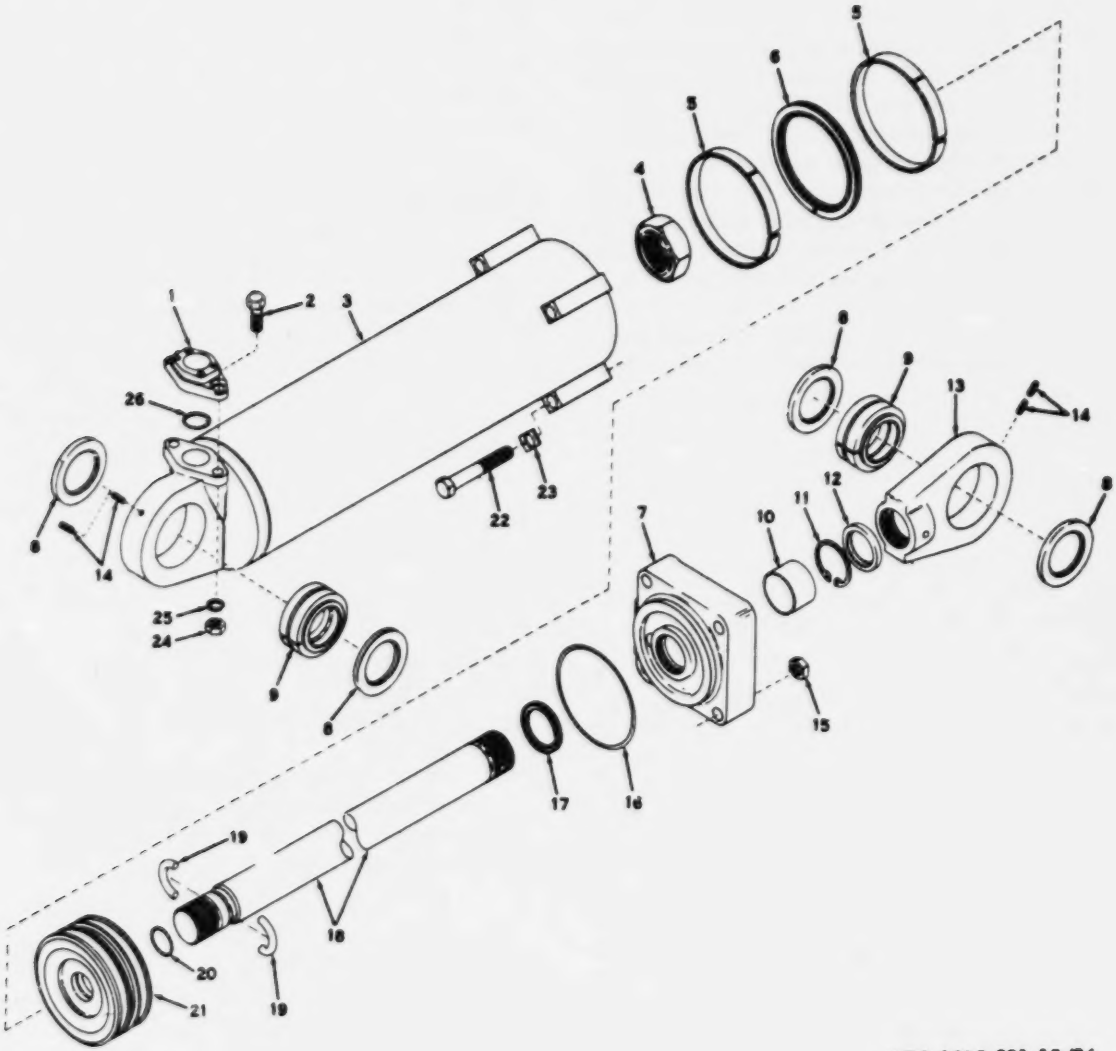
(2) Wipe all exterior parts with a cloth dampened with dry cleaning solvent; dry thoroughly with compressed air.

(3) Clean all interior parts with an approved solvent. Dry thoroughly with compressed air.

(4) Inspect the cylinder for scoring of the bore, dents, distortion, cracks, or other damage; replace a damaged cylinder.

(5) Inspect the push rod for damaged threads or scoring. Check the push rod for distortion by rolling it on a flat surface. Replace a bent or otherwise damaged push rod.

(6) Inspect all other parts for cracks, distortion, or other damage. Replace damaged parts.



1	Adapter	8	Spacer	15	Self-locking nut	22	Bolt
2	Bolt	9	Spherical bearing	16	Preformed packing	23	Pad
3	Cylinder	10	Bushing	17	Rod seal	24	Nut
4	Nut	11	Retaining ring	18	Push rod	25	Lockwasher
5	Support ring	12	Wiper seal	19	Collar (2 req'd.)	26	Preformed packing
6	Piston seal	13	Rod eye	20	Preformed packing		
7	End cap	14	Setscrew	21	Piston		

Figure 36. Bowl control and ejector lift cylinder, exploded view.

e. Reassembly (fig. 36).

(1) Screw the rod eye (13) on the push rod (18).

(2) Install the bushing (10) in the end cap as directed in paragraph 65c. Install a new retaining ring (11), a new rod seal (17) and a new wiper seal (12) in the end cap as directed in paragraph 64c.

(3) Lubricate the push rod with hydraulic fluid. Slide the push rod (18) through the end cap (7) taking care not to damage the seals.

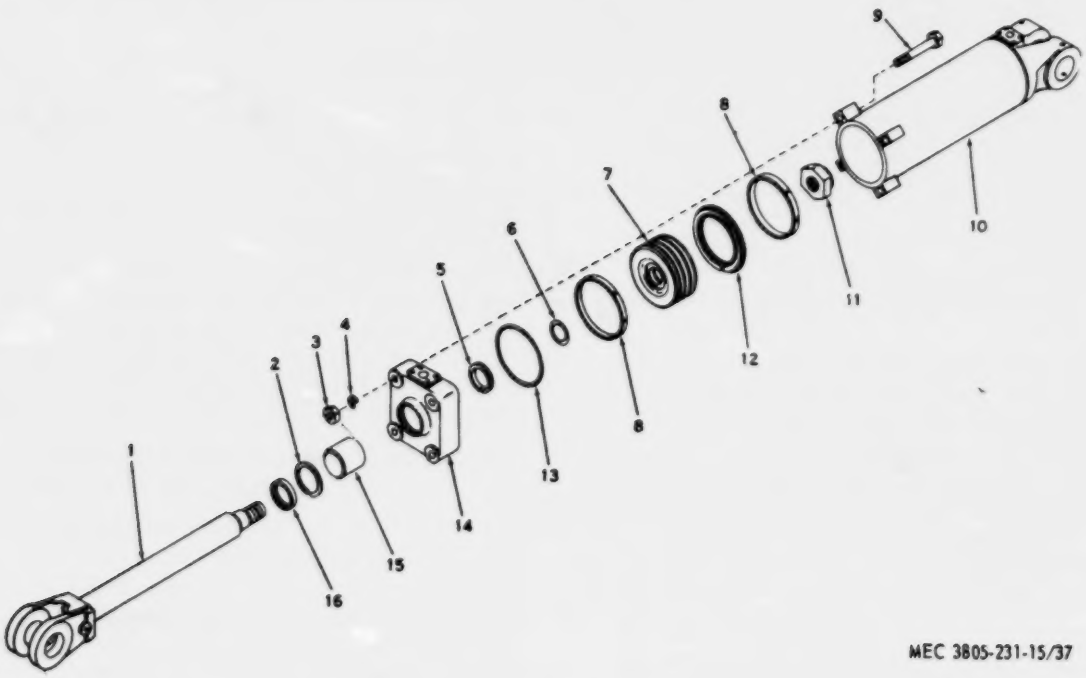
(4) Position a new preformed packing (20) on the piston (21) and position the piston on the push rod. Secure the piston to the push rod with the nut (4) and torque to 5000 foot-pounds (dry).

(5) Position the support rings (5) and a new seal (6) on the piston (21). Position a new preformed packing (16) on the end cap (7).

(6) Thoroughly lubricate the cylinder bore and slide the assembled piston, push rod, and end cap into the cylinder (3); secure the end cap to the cylinder using the four bolts (22), pads (23), and self-locking nuts (15). Draw the bolts and nuts up evenly so that equal space is visible all around between the end cap and the cylinder; torque the nuts to 1900 to 2100 foot-pounds (dry).

(7) Install the spherical bearings (9) in the cylinder and end cap as directed in paragraph 63d.

f. Installation. Install the ejector lift cylinder by reversing the removal procedure described in step a above.



1	Rod assembly	5	Seal	9	Bolt	13	Preformed packing
2	Retaining ring	6	Preformed packing	10	Cylinder	14	End cap
3	Nut	7	Piston	11	Nut	15	Rod bushing
4	Lockwasher	8	Support ring	12	Seal	16	Wiper seal

Figure 37. Apron lift cylinder, exploded view.

67. Apron Lift Cylinder

a. Description. The apron lift cylinder is a single-acting hydraulic cylinder that converts hydraulic pressure into mechanical movement to raise the apron of the scraper to permit loading or unloading of scraped material. One apron lift cylinder is anchored on each of the bowl sides. The push rod of each cylinder connects to an apron lift lever that engages an arm on the apron. The cylinder has a return port on the rod end that allows hydraulic fluid that seeps past the piston to be returned to the prime mover.

b. Removal. Remove the apron lift cylinder as directed in paragraph 43a.

c. Disassembly (fig. 37).

(1) Remove the four bolts (9), lock washers (4), and nuts (3) that secure the end cap (14) to the cylinder (10); remove the end cap, rod assembly (1), and piston assembly from the cylinder.

(2) Remove the nut (11) that secures the piston (7) to the rod assembly; remove the piston assembly from the rod. Slide the rod assembly out of the end cap (14).

(3) Remove the wiper seal (16) and seal (5) as directed in paragraph 64a. Remove the retaining ring (2) and remove the rod bushing (15) from the end cap (14) as directed in paragraph 65a.

(4) Remove the preformed packing (6) and support rings (8), and remove the seal (12) by first removing the retaining rings, then the rubber ring from the piston.

d. Cleaning and Inspection.

(1) Discard all seals, bushings, and packings.

(2) Wipe all parts with an approved dry cleaning solvent. Dry thoroughly with compressed air.

(3) Inspect the cylinder for scoring of the bore, dents, distortion, cracks, or other damage; replace a damaged cylinder.

(4) Inspect the push rod for damaged threads or scoring. Check the push rod for distortion by rolling it on a flat surface. Replace a bent or otherwise damaged push rod.

(5) Inspect all other parts for cracks, distortion, or other damage; replace damaged parts.

e. Reassembly (fig. 37).

(1) Position the rod bushing (15) in the end cap (14); secure with the retaining ring (2). Install the wiper seal (16) and seal (5) in the end cap as described in paragraph 64c.

(2) Carefully slide the rod assembly (1) through the end cap (14), being careful not to damage the seals. Position a new preformed packing (6), a new seal (12), and new support rings (8) on the piston (7). Position the piston on the rod assembly (1); secure with the nut (11). Torque the nut to 950 to 1000 foot-pounds (dry).

(3) Lubricate all contact surfaces with hydraulic fluid. Slide the assembled rod and end cap into the cylinder (10). Secure the end cap (14) to the cylinder (10) with four bolts (9), lock washers (4), and nuts (3). Tighten the nuts evenly all around to maintain equal space between the end cap (14) and cylinder (10). Torque the nuts to 400 to 440 foot-pounds (dry).

f. Installation. Install the apron lift cylinder by reversing the removal procedure described in paragraph 43a.

68. Bowl Control Cylinder

a. Description. The bowl control cylinder is a single-acting hydraulic cylinder that converts hydraulic pressure into mechanical movement to raise the bowl to regulate the depth of the cut. The cylinder is anchored to a bracket on the gooseneck of the pull yoke. The push rod is connected to the bowl to permit the front of the bowl to be raised or lowered with the rear axle acting as the fulcrum. The cylinder intake port provides the mounting for the bowl lock/quick drop valve. The hydraulic lines connect to the valve. The cylinder has a return port at the rod end that allows any hydraulic fluid that seeps past the piston to be returned to the prime mover.

b. Removal. Remove the bowl control cylinder as directed in paragraph 44a.

c. Disassembly. Cleaning and Inspection, and Reassembly. The disassembly, cleaning and inspection and reassembly instructions are identical to those for the ejector lift cylinder in paragraph 66b through 66d.

d. Installation. Install the bowl control cylinder as directed in paragraph 44c.

Section IV. BRAKE SYSTEM

69. Brake Assembly

a. Description. The brake assembly is hydraulically actuated by the brake actuator which, in turn, is operated by air pressure from the prime mover. The brake assembly consists of a hollow rubber expander tube, which is circular in shape and fits inside the brake drum. Brake blocks are positioned between the expander tube and the brake drum, and, when hydraulic fluid is forced into the tube, the tube expands and forces the brake blocks against the brake drum to slow or stop the progress of the scraper. The brake blocks are prevented from rotating by a frame which holds them in position.

b. Removal. Remove the brake assemblies as directed in paragraph 55a.

c. Disassembly (fig. 38).

(1) Position the brake assembly to provide access to the ends of the retracting springs (4).

(2) Place a screwdriver against the hook of the retracting spring (4) and, with a sharp blow, disengage the spring from the frame (1). Drive the springs through the frame and out of the brake assembly.

(3) After all retracting springs have been removed, lift the brake blocks (5) from the frames (1).

Note. Brake lining replacement is done by replacing brake blocks. Brake blocks can be replaced without further disassembly. Replacement must be done in full sets of 12 linings only, and each brake block must be installed with a new retracting spring and shield. Before relining brakes, remove all dirt from between the expander tube (9) and the frames (1).

(4) Remove the self-locking nuts (11), bolts (7), and bushings (8). Drive the bushings out with a drift pin; remove the frames (1) from the torque plate (10).

(5) Slip the expander tube (9) and inlet connection (2) from the torque plate (10). Remove the inlet connection (2) and two preformed packings (3) from the nozzle of the expander tube.

d. Cleaning and Inspection.

(1) Wipe all parts of the brake assembly with a clean cloth dampened in cleaning solvent; dry thoroughly with compressed air.

(2) If the brake blocks are not to be replaced, clean them with a wire brush. Clean oily or gummy deposits with a cloth dampened in dry cleaning solvent. Dry thoroughly with compressed air.

(3) Inspect the expander tube (9) for leakage, heat damage, deterioration, and loose fabric or rubber around the base of the nozzle that might permit leakage of fluid; replace damaged parts.

(4) Inspect the brake blocks for damage or separation from the shoe; re-rivet them if loose. Sand brake blocks to remove any shiny spots.

(5) Inspect the frames for cracks, breaks, or distortion; replace a damaged frame.

(6) Check for cracked or distorted retracting springs. Replace damaged parts.

Note. Do not replace springs singly. Replace only in sets of 12 to ensure uniform retraction.

(7) Replace all preformed packings in the brake assemblies.

(8) Inspect the expander shields for cracks, distortion, or breaks. Replace all 12 shields if any are defective.

e. Reassembly (fig. 38).

(1) Install two new preformed packings (3) on the expander tube nozzle (12),

lubricating them with hydraulic fluid before installation to avoid damaging the packing. Lubricate the nozzle of the inlet connection (2) and insert the nozzle (12) of the expander tube (9). Slip the expander tube and inlet connection over the torque plate (10).

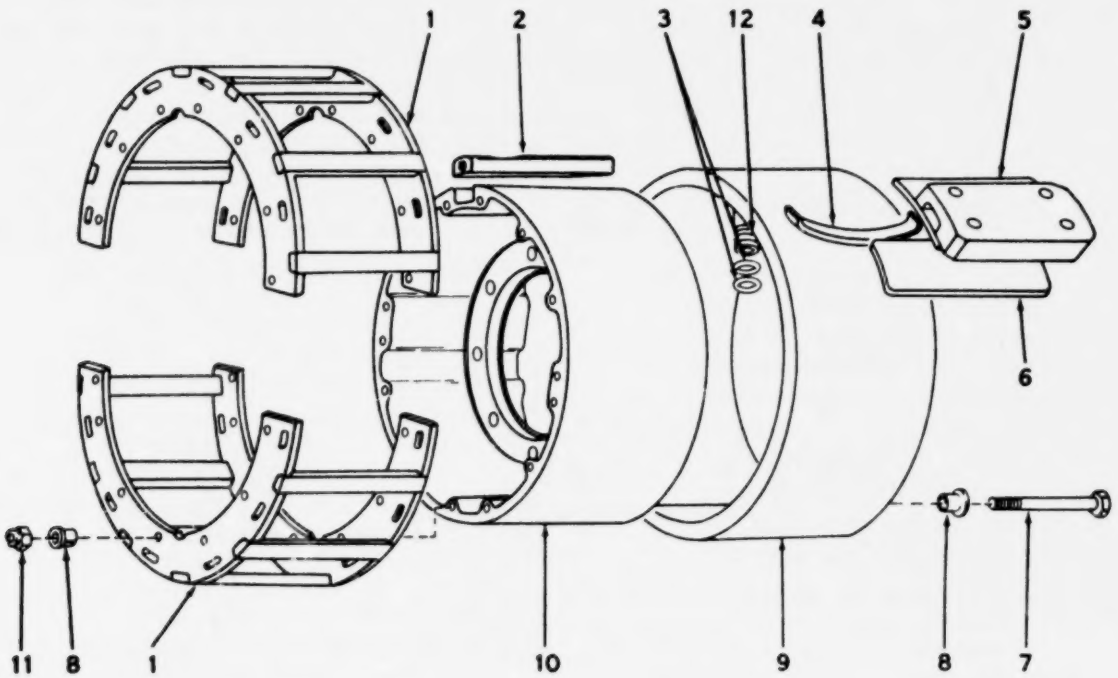
Note. Be sure the inlet connection faces inboard, or installation on the scraper will not be possible.

(2) Slide the frames (1) over the expander tube (9) and torque plate (10), making sure that the inlet connection (2) lines up with the frame cutout provided and all frame bolts holes line up with the holes in the torque plate. If misalinement occurs, the frame is on backwards and should be turned around.

(3) Install the bolts (7) and bushings (8). Lubricate the bolt threads with engine oil. Install the self-locking nuts (11) and torque them to 56 to 60 foot-pounds.

(4) Place a brake block (5) between the torque bars of the frame (1). Insert a retracting spring inserting tool through the frame spring slot; insert a retracting spring (4) through the opposite slot so that the tool blade is between the spring and the brake lining material and holds the brake block in place. Remove the tool.

(5) Apply Permatex No. 2 or equivalent across the face of the expander shield (6) to be placed next to the expander tube (9); slip the shield about 1 inch under the brake block positioned in



1 Frame
2 Inlet connection
3 Preformed packing
4 Retracting spring
5 Brake block
6 Expander shield
7 Bolt
8 Bushing
9 Expander tube
10 Torque plate
11 Self-locking nut
12 Nozzle

Figure 38. Brake assembly, exploded view.

step (4) above. Insert the shield through the frame opening for the second brake block.

(6) Install the second brake block (5) and expander shield (6) in the same manner as the first, except drive the retracting spring (4) fully into position and remove the inserting tool.

(7) Place the expander shields (6) for the next brake block (5) and continue the procedure until all the brake blocks have been installed. Remove the first brake block (5) that was installed and install the expander shields (6); install the brake block in the same manner as directed above.

f. Installation.

(1) Install the brake assemblies by reversing the removal procedure described in paragraph 55a. Torque the brake assembly mounting bolts to 270 foot-pounds (dry).

(2) When installing the axle nut (10, fig. 27), tighten the nut by rotating the wheel with the spanner wrench installed until the bearings start to bind. Back off the nut until the side or bottom rollers do not rotate. Rotate the wheel and retighten the nut until all rollers rotate. Make a rolling torque check. Tighten the nut until a rolling torque of 20 to 50 foot-pounds is attained. Install the cotter pin (5).

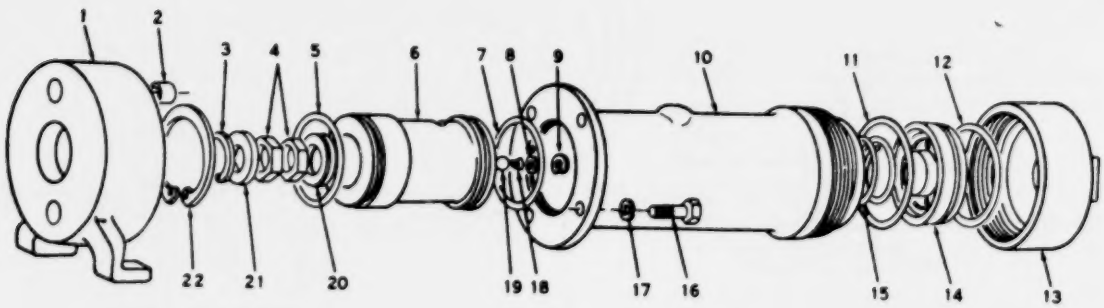
(3) Bleed the brake system as directed in paragraph 53*a*.

70. Brake Actuator Assembly

a. General.

(1) The brake actuator assembly consists of an air brake chamber (10, fig. 25) and a hydraulic brake master cylinder (9). The brake chambers are used to convert the mechanical force of compressed air from the prime mover to the motion and energy required by the master cylinder to actuate the brake assemblies located in the wheels.

(2) The master cylinder piston is directly connected to the brake chamber push rod. When the brakes are actuated, the air entering the brake chamber forces the push rod forward. This forward motion of the push rod also forces the master cylinder piston forward, which, in turn, forces hydraulic fluid into the expander tube in the brake assembly and operates the brakes. When the air pressure is removed from the brake chamber, the push rod returns to its original posi-



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1	Mounting bracket	7	Preformed packing	13	Cap	19	Ball
2	Bushing	8	Washer	14	Piston assembly	20	Washer
3	Retaining ring	9	Retaining ring	15	Spring	21	Washer
4	Nut	10	Cylinder	16	Bolt	22	Retaining ring
5	Preformed packing	11	Preformed packing	17	Lockwasher		
6	Piston	12	Preformed packing	18	Spring		

Figure 39. Brake master cylinder, exploded view.

tion and draws the master cylinder with it, thereby releasing the brakes.

(3) The master cylinder automatically adjusts the brakes for lining wear through a sensing piston mounted within the master cylinder.

b. Removal. Remove the brake actuator asbly as directed in paragraph 54a.

c. Disassembly.

(1) Remove the bolts (16, fig. 39) and lock washers (17) that secure the cylinder (10) to the mounting bracket (1). Apply air pressure to the air brake chamber to actuate the brake. While the cylinder is extended away from the mounting bracket, remove the retaining ring (3) that secures the push rod assembly (17, fig. 40) to the piston (6, fig. 39); remove the piston and associated parts from the push rod assembly. Slowly release the air pressure from the chamber.

(2) Remove the retaining ring (22) that secures the piston (6) to the cylinder (10). Slide the piston out of the cylinder and remove the washer (20), retaining ring (9), washer (8), spring (18), and ball (19). Remove the preformed packings (5 and 7) from the piston.

(3) Install the cylinder in a soft-jawed vise and remove the cap (13) from the cylinder (10); remove the preformed packing (11) from the end cap. Remove the piston assembly (14) and spring (15) from the cylinder; remove the preformed packing (12) from the piston.

(4) Remove the two nuts (4) and washer (21) from the push rod assembly (17, fig. 40). Remove the nuts (8) and lock washers (12) that secure the mounting bracket (1, fig. 39) to the brake chamber; remove the mounting bracket from the cover.

(5) Remove the boot (10, fig. 40) from the push rod. Use C-clamps to clamp the cover (7) to the body (16) of the brake chamber. Remove the cap screws (13), lock washers (11), and flat washers (14) that secure the cover to the body. Carefully loosen the C-clamps and remove the cover from the body.

Warning: **The cover is heavily spring-loaded by springs (5 and 6). Failure to apply C-clamps to the brake chamber before removing the cover may cause the cover to be ejected with enough force to cause bodily injury.**

(6) Remove the two springs (5 and 6) from the brake chamber.

(7) Remove the nuts (18) and lock washers (19) that secure the outer clamp (3) to the body (16). Remove the push rod assembly (17), diaphragm (4), and associated parts from the body by pulling out the push rod.

(8) Straighten the rolled diaphragm and remove the outer clamp (3). Remove the nuts (1) and lock washers (22) that secure the inner clamp (20) and diaphragm guide (2) to the push rod assembly (17). Remove the inner clamp and diaphragm guide. Remove the diaphragm (4) from the diaphragm guide. Remove the spring guide (21) from the push rod assembly.

(9) Remove the studs (9) from the cover (7) if they are damaged.

d. Cleaning and Inspection.

(1) Discard all preformed packings.

(2) Clean all metal parts of the brake actuator assembly with an approved cleaning solvent; dry thoroughly with a clean cloth.

Caution: **Do not immerse the piston assembly (14, fig. 39) in cleaning solution as it will destroy the internal rubber parts of the piston.**

(3) Inspect all metal parts for breaks, cracks, distortion, or other damage; replace any defective part.

(4) Inspect the diaphragm and boot for cracks or deterioration to the rubber; replace defective parts.

(5) Check the operation of the piston assembly (14) by inserting a smooth, blunt tool into the small opening in

the face of the piston assembly and pushing inward. If a definite movement cannot be easily obtained, replace the piston assembly. If there is movement, apply low-pressure compressed air at the opening to produce a pressure inside the piston assembly. If air passes through, replace the piston assembly.

(6) Check the inside of the brake master cylinder for scoring, wear, or other damage; replace a worn or damaged part.

e. Reassembly.

(1) Lubricate the inside of the brake chamber body (16, fig. 40) and both sides of the diaphragm (4) with diaphragm lubricant (Bendix-Westinghouse Specification BW-290-M or equivalent).

(2) Lay the inner clamp (20) on a bench and position the small end of the diaphragm (4) inside the flange. Slide the diaphragm guide (2) and push rod assembly (17) down into the diaphragm; position them on the studs in the body (16); secure them with the nuts (1) and lock washers (22).

(3) Slide the diaphragm assembly down into the outer clamp (3) and roll the diaphragm (4) back over the fluted edge of the outer clamp.

(4) Slide the assembled push rod and diaphragm into the body (16) and position it so that the heads of the studs in the body pass through the holes provided; secure the assembled push rod and diaphragm with nuts (18) and lock washers (19).

(5) If the studs (9) were removed, install new studs in the cover (7).

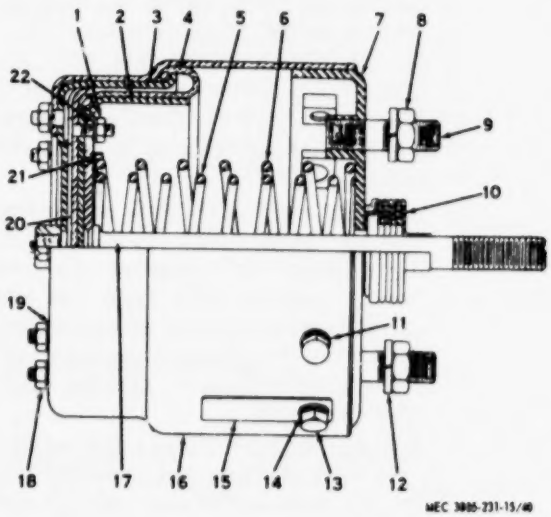
(6) Position the spring guide (21) and two springs (5 and 6) on the push rod; position the cover (7) over the push rod assembly (17) and, using C-clamps, aline the cover so that it can be secured with the cap screws (13) lock washers (11), and flat washers (14); secure the cover. Position the boot (10) on the cover and push rod.

(7) Connect the brake chamber to a 100-psi compressed air line; apply pressure. The push rod must move out quickly without binding. Release the pressure. The push rod must retract completely with no binding.

(8) Cover the boot (10) and cover (7) with soap suds and apply air pressure to the brake chamber; check for leakage. No leakage is allowed at these points. If leakage is observed or the operation of the brake chamber is not quick and smooth, dismantle the brake chamber and check for the cause of faulty operation.

(9) Lubricate the bore of the cylinder (10, fig. 39) with Military Specification MIL-L-2104A, Amendment 1, Grade 10. Insert the spring (15) into the bore of the cylinder.

Caution: **Do not use automotive brake fluid in this brake system.**



1	Nut	12	Lockwasher
2	Diaphragm guide	13	Cap screw
3	Outer clamp	14	Flat washer
4	Diaphragm	15	Tag
5	Spring	16	Body
6	Spring	17	Push rod assembly
7	Cover	18	Nut
8	Nut	19	Lockwasher
9	Stud	20	Inner clamp
10	Boot	21	Spring guide
11	Lockwasher	22	Lockwasher

Figure 40. Air brake chamber, cross-section.

Automotive brake fluid will cause deterioration of rubber parts and greatly shorten the effective life of the unit.

(10) Check and place the preformed packing (12) on the piston assembly (14); insert the piston assembly into the cylinder (10). Position the preformed packing (11) in the cap (13), turn the cap onto the cylinder, and torque to 50 foot-pounds minimum.

(11) Position the ball (19), spring (18), and washer (8) in the piston (6) and secure with the retaining ring (9). Lubricate the preformed packings (5 and 7) with hydraulic fluid; position them on the piston (6). Insert the piston into the cylinder (10); secure the piston in the cylinder by placing the retaining ring (22) into the cylinder slot provided.

Note. The preformed packing (5) is identified by a white paint slash on its outside diameter. This preformed packing must be positioned in the correct groove for proper operation of the brake master cylinder.

(12) Position the mounting bracket (1) on the brake chamber cover (7, fig. 40); secure with the lock washers (11) and nuts (8). Place the washer (21, fig. 39) and nuts (4) on the push rod assembly (17, fig. 40) so that there is a distance of $^{9}/_{16}$ inch between the face of the washer and the mounting bracket. When this distance has been attained, jam the two nuts together to lock them in place.

(13) Position the washer (20, fig. 39) into the piston (6). Apply 100-psi air pressure to actuate the brake chamber. While the push rod assembly (17, fig. 40) is extended, slide the assembled brake master cylinder on the push rod so that the nuts (4, fig. 39) are up tight against the washer (20); secure the piston to the push rod assembly by installing the retaining ring (3) in the piston.

(14) Release the air pressure from the brake chamber and secure the cylinder (10) to the mounting bracket (1) with four bolts (16) and lock washers (17).

f. Installation. Install the brake actuator assembly by reversing the removal procedure described in paragraph 54a. Fill the brake hydraulic fluid reservoir (4, fig. 25) with Military Specification MIL–L–2104A, Amendment 1, Grade 10.

71. Relay-Emergency Valve

a. Description.

(1) The service air hose from the prime mover connects to the relay-emergency valve. When air is supplied to the valve, it is ported through the valve to supply air to the brake actuator assemblies to apply the scraper brakes.

(2) The emergency air hose also connects to the relay-emergency valve. Air is supplied to the valve at all times during scraper operation. The air is ported to the air reservoir to maintain air pressure in the reservoir for emergency operation.

(3) When the emergency connection between the scraper and prime mover is broken, the relay-emergency valve closes the path from the reservoir to the emergency connection and ports pressure from the reservoir to the brake actuators to cause the brake system to stop the movement of the scraper. This prevents the scraper from uncontrolled movement if the scraper breaks away from the prime mover during operation.

b. Removal. Remove the relay-emergency valve as directed in paragraph 47b.

c. Disassembly (fig. 41).

(1) Remove the screws (6) that secure the exhaust cover (5) to the cover (8); remove the exhaust cover, washer, and diaphragm (7) from the cover (8).

(2) Remove the bolts (1), lock washers (2), and washers (3) that secure the cover to the body; remove the identification plates (4 and 9), cover, and preformed packing (43).

(3) Remove the relay piston (41) and piston return spring (39) from the body (38); remove the seal (40) and preformed packing (42) from the relay piston.

(4) Remove the pipe plugs (34, 35, and 37) and filters (36). Remove the cap screw (30), preformed packing (31), check valve spring (32), and check valve (33) from the body (38).

(5) Remove the bleeder valve (29) and breather valve (26) from the body (38).

(6) Remove the bolts (27) and lock washers (28) that secure the cover (25) to the body; remove the cover, gasket (24), emergency piston spring (23), shim (22), and emergency piston assembly (items 10 through 21) from the body. Remove the preformed packings (14 and 16) from the emergency piston assembly.

(7) Turn the cap nut (21) off the emergency piston assembly; remove the preformed packing (20) and valve spring (19).

(8) Remove the screw (11) and washer (12) from the inlet valve body (17); remove the exhaust valve (13) and preformed packing (10). Slide the inlet valve body (17) out of the emergency piston (15) and remove the preformed packing (18).

d. Cleaning and Inspection.

(1) Discard all preformed packings, gaskets, and the seal (40, fig. 41).

(2) Wash all metal parts with an approved cleaning solvent; dry with clean, dry compressed air.

(3) Inspect the valve seats for cracks, scoring, or other damage.

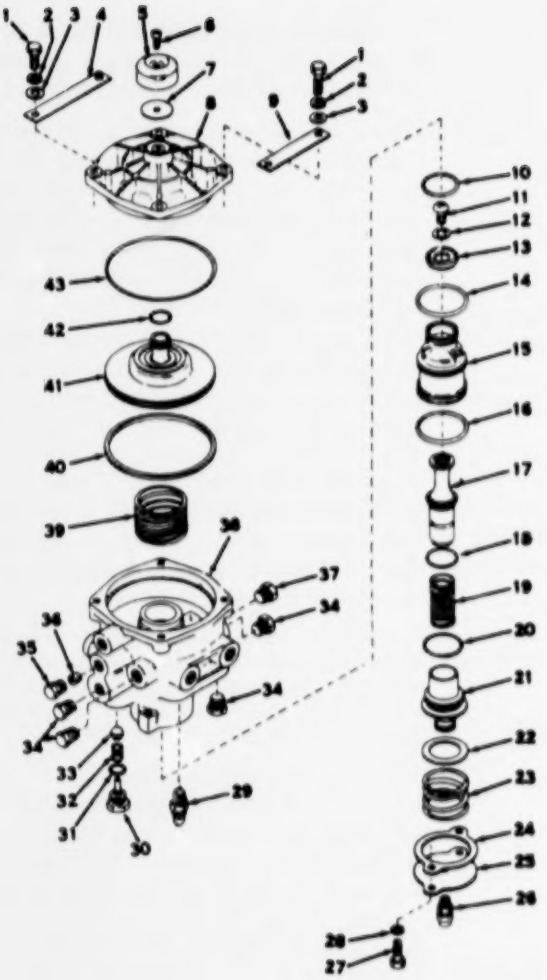
(4) Inspect the pistons for cracks, nicks, scratches, or excessive wear.

(5) Inspect the check valve and exhaust valve for wear or damage.

(6) Inspect the body for cracks, grooves, excessive wear, stripped threads, or other damage.

(7) Check the springs for cracks, distortion, and for pressure load as follows:

Piston return spring	16 oz at $2^{37}/_{64}$ in.
Valve spring	8 lb at $1^{9}/_{16}$ in.
Emergency piston spring	$52^{1}/_{2}$ lb at $1^{3}/_{16}$ in.
Check valve spring	$4^{1}/_{2}$ oz at $^{27}/_{32}$ in.



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1	Bolt	23	Emergency piston spring
2	Lockwasher	24	Gasket
3	Washer	25	Cover
4	Indentification plate	26	Breather valve
5	Exhaust cover	27	Bolt
6	Screw	28	Lockwasher
7	Diaphragm	29	Bleeder valve
8	Cover	30	Cap screw
9	Identification plate	31	Preformed packing
10	Preformed packing	32	Check valve spring
11	Screw	33	Check valve
12	Washer	34	Pipe plug
13	Exhaust valve	35	Pipe plug
14	Preformed packing	36	Filter
15	Emergency piston	37	Pipe plug
16	Preformed packing	38	Body
17	Inlet valve body	39	Piston return spring
18	Preformed packing	40	Seal
19	Valve spring	41	Relay piston
20	Preformed packing	42	Preformed packing
21	Cap nut	43	Preformed packing
22	Shim		

Figure 41. Relay-emergency valve, exploded view.

(8) Replace all excessively worn or damaged parts.

(9) Check that the bleeder vent and cap of the bleeder valve are free to move back and forth; if either is up, replace the bleeder valve.

(10) Check the bleeder valve and breather valve with a manometer as follows:

(*a*) The bleeder valve and breather valve must open at maximum pressure equivalent to 12 inches of water.

(*b*) The bleeder and breather valves must hold a vacuum of 6 inches of water with maximum leakage of 1½ inches on the test fixture.

(11) Inspect the diaphragm for cracks, breaks, or deterioration; replace a damaged diaphragm.

e. Reassembly (fig. 41).

Note. **The preformed packings and the seal that slide against a mating surface must be lubricated with molybdenum lubricant, Bendix-Westinghouse Specification BW-266-M or equal. Lubricate the mating surfaces before reassembly.**

(1) Position a new preformed packing (18) on the inlet valve body (17); install the inlet valve body in the emergency piston (15). Position the exhaust valve (13) and washer (12) on the inlet valve body; secure with the screw (11). Torque the screw to 100 inch-pounds.

(2) Position new preformed packings (10, 14, and 16) on the emergency piston (15).

(3) Slide the valve spring (19) into the inlet valve body (17). Position a new preformed packing (20) on the emergency piston cap nut (21); turn the emergency piston cap nut into the emergency piston (15). Torque to 225 inch-pounds.

(4) Insert the emergency piston assembly (items 10 through 21) into the body (38). Position a shim (22) of the same size as that removed on the emergency piston cap nut (21) and install the emergency piston spring (23).

(5) Position the cover (25) and gasket (24) on the body (38); secure with lock washers (28) and bolts (27).

(6) Coat the threads of the breather valve (26) and bleeder valve (29) with Permatex No. 2 or equivalent, and install the breather valve and bleeder valve.

(7) Position the check valve (33) and check valve spring (32) in the body (38). Install the preformed packing (31) on the cap screw (30) and install the cap screw.

(8) Insert two new filters (36) in the service and emergency line ports; turn the pipe plugs (37, 35, and 34) into all ports if the valve is to be stored or transported. If the relay-emergency valve is to be installed on the scraper immediately after reassembly, insert the pipe plugs (35) to secure the filters (36).

(9) Position a new preformed packing (42) on the relay piston (41). Install the seal (40) on the relay piston dry; position the piston return spring (39) in the body (38); lubricate the outside diameter of the seal (40) and insert the relay piston (41) into the body (38)

(10) Position a new preformed packing (43) on the cover (8) and place the cover on the body (38); position the identification plates (4 and 9) on the cover and secure the cover with four washers (3), lock washers (2), and bolts (1).

(11) Position the diaphragm (7) and exhaust cover (5) on the cover (8) and secure with the screw (6).

f. Testing.

(1) Connect the relay-emergency valve to an air reservoir. Connect a supply of clean, dry compressed air to the emergency port of the valve. Refer to figure 23. Provide a means of controlling and checking the air pressure to the emergency port (1, fig. 23).

(2) Install a gage to register the pressure from the brake chamber ports.

(3) Apply 100-psi air pressure to the emergency port of the relay-emergency valve until the reservoir pressure stabilizes. Release air pressure

until the emergency valve operates, allowing pressure to pass to the brake chamber ports.

(4) Check the emergency input pressure at which the valve switched to emergency operation. It must occur between 23 and 45 psi.

(5) Check the output pressure from the brake chamber ports. It must be 60 psi maximum.

(6) If brake chamber output pressure is incorrect, add or delete shims (22, fig. 41) to achieve the correct output pressure.

(7) If the valve fails to switch to emergency operation in the required range, disassemble the valve and recheck the spring valve given in step d(7) above. Check for binding of the operating parts.

g. Installation. Install the relay-emergency valve by reversing the removal procedure described in paragraph 47*b*.

Section V. PULL YOKE, BOWL, AND TAIL ASSEMBLIES

72. Ejector Assembly

a. General. The ejector assembly (1) is connected to the cutter base plate by two hinge pins (31) passed through two hinge halves; one half is located on the ejector assembly, and the other half on the cutter base plate. The ejector assembly is lifted through the use of a lever system and a hydraulic cylinder.

b. Removal.

(1) Using a cold chisel, cut the hinge pin cover plate (30) off both sides of the bowl.

(2) Using a long drift pin, drive the two hinge pins (31) out of the ejector hinge.

Note. The hinge pins are over 50 inches long. Start driving the pin out with a short drift pin and use progressively longer drift pins until both hinge pins have been removed.

(3) Open a shackle (2) and remove the chain (3) and shackles from the ejector assembly.

(4) Connect a hoist capable of supporting 3500 pounds to the hoisting bracket located at the top inside of the ejector assembly (1); lift the ejector assembly out of the scraper.

c. Cleaning and Inspection.

(1) Clean the ejector with a low-pressure water stream. Steam-clean to remove greasy or gummy deposits.

(2) Remove all rust and loose paint from the ejector.

(3) Inspect the ejector and welds for cracks, breaks, or distortion; weld any cracks and realine any distortions.

(4) Inspect the hinge half for distortion, cracks, or other damage; repair damage by bending or welding.

(5) Hammer out any dents in the ejector.

(6) Paint the ejector completely.

Note. Do not allow paint to drip in the hinge half as this will hamper installation.

(7) Clean the hinge pins, using sandpaper or emery cloth; remove any rust.

(8) Inspect the pins for distortion, breaks, or cracks; replace damaged hinge pins.

d. Installation. Install the ejector by reversing the removal procedure described in step b above.

73. Ejector Lift Lever

a. General. The ejector lift lever is actuated by the ejector lift cylinder to lift ejector assembly into a dumping position. The ejector lift lever is not connected to the ejector, but is connected to the tail assembly with a pin and bushing. The other end of the ejector lift lever is provided with a roller that rides against the back of the ejector assembly to raise it in a swinging motion.

b. Removal and Disassembly.

(1) Raise the ejector assembly (1) until the ejector lock pin (26) can be positioned into the locking bracket. Position the ejector assembly lock pins and lower the ejector lift lever until the

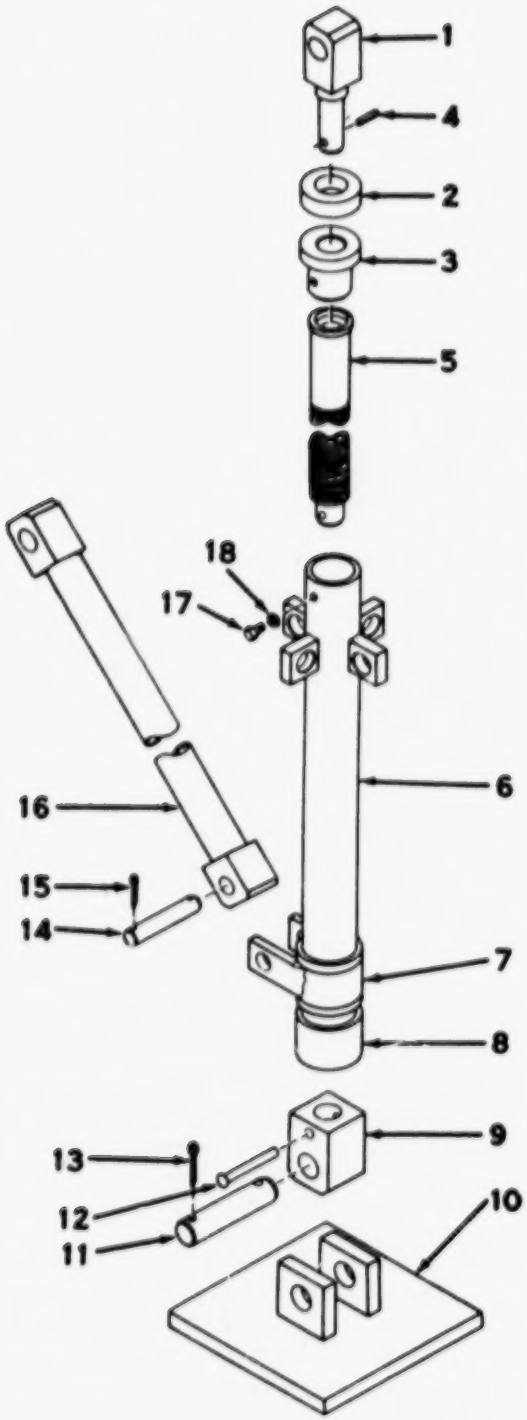

Figure 42. Pull yoke jack, exploded view.

1	Spindle	10	Base plate assembly
2	Spirol pin	11	Pin
3	Thrust bearing	12	Rivet
4	Spindle bushing	13	Cotter pin
5	Screw assembly	14	Pin
6	Column	15	Cotter pin
7	Sleeve collar	16	Strut
8	Nut	17	Screw
9	Screw end	18	Lockwasher

Figure 42.—Continued.

pins stop the ejector assembly; lower the ejector lift lever (5) to the fully lowered position.

(2) Remove the bolt (9), lock washer (8), and pin assembly (7), from the forward rod eye of the ejector lift cylinder. To release the ejector lift lever (5) from the cylinder, support the ejector lift lever with a hoist; remove the bolt (23) and lock washer (24) and drive out the pin assembly (25) from the mounting bracket and ejector lift lever; hoist the ejector lift lever from the scraper.

(3) If the rollers (44) are damaged, burn off the weld on each side of the rollers. Drive out the pin assembly (43) and remove the rollers.

(4) Remove the grease fittings (6) and bushings (4) from the ejector lift lever (5).

c. Cleaning and Inspection.

(1) Steam-clean all dirt and grease from the ejector lift lever. Remove greasy deposits with an approved cleaning solvent; dry thoroughly.

(2) Inspect the ejector lift lever for cracks, breaks, or other damage; weld cracks or breaks.

(3) Inspect the ejector lift lever bushings (4) for wear, scoring, cracks, a loose mounting in the lever, or other damage. If damaged, press out the bushings and press new bushings into place.

(4) Inspect the rollers (44) for chips, cracks, breaks, and free rotation without excessive play. If the rollers are damaged, or if the roller bushings are excessively worn, replace the ejector lift lever.

d. Reassembly and Installation. Reassemble and install the ejector lift lever by reversing the removal and disassembly procedure described in step b above.

74. Pull Yoke Jack

a. General. The pull yoke jack is used to support the pull yoke when the scraper is not attached to the prime mover, and also to aline the scraper mounting plate with the prime mover mounting plate. It is a screw-type jack with a movable collar and brackets into which a bar is placed to turn the pull yoke up or down.

b. Removal. Remove the pull yoke jacks as directed in paragraph 61*a*.

c. Disassembly.

(1) Remove the cotter pins (13) and remove the pin (11) that secures the base plate assembly (10) to the screw end (9); remove the base plate assembly.

(2) Grind off the peened end of the rivet (12). Remove the rivet and remove the screw end (9) from the screw assembly (5).

(3) Remove the screws (17) and lock washers (18) from column (6); remove the assembled spindle (1), thrust bearing (3), spindle bushing (4), and spirol pin (2).

(4) Using a drift pin, drive the spirol pin (2) out of the spindle bushing (4) and spindle (1); remove the spindle and thrust bearing (3).

(5) Turn the screw assembly (5) from the column.

(6) Remove the cotter pins (15) and pin (14) that secure the strut (16) to the column (6); remove the strut.

(7) If damaged, burn off the weld and remove the nut (8) and sleeve collar (7) from the column.

d. Cleaning and Inspection.

(1) Clean all metal parts with a cloth dampened in dry cleaning solvent; dry thoroughly.

(2) Inspect all parts for breaks, cracks, or distortion; replace any damaged parts.

(3) Inspect the screw for damaged threads and distortion; replace a damaged screw.

e. Reassembly and Installation.

(1) Reassemble the pull yoke jack by reversing the disassembly procedure described in step c above.

(2) Install the jack by reversing the removal procedure described in paragraph 61a.

75. Pull Yoke

a. Description. The pull yoke (35) is of welded steel construction. It consists primarily of a gooseneck, torque tube, and pull arms. The gooseneck provides a mounting plate to connect the assembly to the prime mover. The pull arms connect to the ball studs on the side and tail assembly, and provide the means of towing the scraper. The torque tube supplies the spacer between the pull arms. The ball stud and socket arrangement between the pull arms and the side and tail assembly allow the bowl to be pivoted to regulate the depth of cut of the scraper.

b. Removal.

(1) Support the pull yoke (35) with a hoist capable of handling 7000 pounds. Attach the hoist sling between the lifting eyes on the torque tube.

(2) Remove the bowl control cylinder as directed in paragraph 44*a*.

(3) Remove the hydraulic manifold and all tubing and hoses from the pull yoke (par. 45a).

(4) Remove the pull yoke jacks as directed in paragraph 6*a*.

(5) Use a drift to drive the spirol pins (34) from the pins (33) on each side of the scraper. Drive out the pins and remove the pull arm seat (32).

(6) Hoist the pull yoke assembly (35) and pull it slightly forward to disengage it from the ball studs on the sides of the side and tail assembly (19).

c. Cleaning and Inspection.

(1) Clean the pull yoke with a low-pressure stream of water. Steam-clean if necessary to remove greasy or gummy deposits.

(2) Clean the pull arm seats and the pins with an approved cleaning solvent.
(3) Check the pull yoke for cracked weldments, distorted members, worn mounting plate holes, or other damage. Weld cracks and straighten distorted members.
(4) Inspect the pull arm seat for cracks, worn seating surfaces, and distorted mounting holes; replace a damaged pull arm seat.
(5) Inspect the mounting pins for wear or distortion; replace damaged pins.

d. Installation. Install the pull yoke assembly by reversing the removal procedure described in step b above.

76. Stub Axles
(fig. 27).

a. Description. The stub axles are mounted in the axle housing welded to each side of the bowl assembly. They are retained by a bolt and locking nut. The stub axles provide a mounting seat for the tapered roller bearings on which the wheels rotate.

b. Removal.
(1) Remove the wheel assemblies as directed in paragraph 52a.
(2) Loosen the nut (2) and remove the bolts (1) from the axle housing; remove the stub axle (3) from the axle housing.

c. Cleaning and Inspection.
(1) Wipe all grease and dirt from the stub axle, using a cloth dampened in dry cleaning solvent; dry thoroughly.
(2) Inspect the axle for cracks, breaks, distortion, or other forms of damage; replace a damaged axle.
(3) Inspect stub axle threads; if slightly damaged, run thread die over them a few times; replace the stub axle if threads are seriously damaged.
(4) Inspect the bearing seat for scoring or signs of overheating; replace a damaged stub axle.

d. Installation.
(1) Slide the stub axle (3) into the axle housing until it is positioned so that the bolt (1) and nut (2) can be turned down into the locking slot provided on the stub axle.

***Caution:* Be sure that the bolt is set into the locking slot. If the stub axle is not properly locked, it could work its way off during operation of the scraper.**

(2) Install the wheel assembly as directed in paragraph 52c.

77. Brake Drums
(fig. 27)

a. Description. The brake drums are bolted to the wheel assemblies and rotate with them. The brake assemblies are mounted within the brake drums and when the brakes are applied, the brake blocks press against the insides of the brake drums to restrict the rotation of the wheels.

b. Removal.
(1) Remove the wheel assemblies as directed in paragraph 52a.
(2) Remove lock wires (18) and bolts (17) that secure the brake drum (19) to the wheel assembly; remove the brake drum.

c. Cleaning and Inspection.
(1) Clean the brake drum with an approved solvent and dry thoroughly with compressed air.
(2) Inspect the brake drums for cracks, scoring, and eccentricity. If the drums are badly scored or distorted, replace them. Turn down a slightly scored or eccentric drum on a lathe, taking light cuts until all scoring or eccentricity is removed. Finish to a smooth surface.

d. Installation.
(1) Install the brake drums by reversing the removal procedure described in step b above.
(2) Replace the wheel assemblies as directed in paragraph 52c.
(3) Bleed the brake system as directed in paragraph 53a.

78. Side and Tail Assembly

a. Description. The side and tail assembly is a huge welded unit on which all major compo-

nents of the scraper are mounted. The tail assemby is provided with a pusher bar at the rear against which a second power source can be used to assist the prime mover during operation. The flat center portion on which the cutter blades are mounted is referred to as the bowl.

b. Cleaning and Inspection.

(1) Clean the side and tail assembly with a pressurized water stream. Steam-clean if necessary to remove oily or gummy deposits.

(2) Inspect the side and tail assembly for cracked weldments, distorted frame members, broken mounting brackets, and other damage. Weld all cracks; hammer out dents; straighten all frame members. Take care when using heat to straighten parts. Excessive heat can remove the temper of the steel and weaken the part.

CHAPTER 5

DEMOLITION, SHIPMENT, AND LIMITED STORAGE

Section I. DEMOLITION OF THE SCRAPER TO PREVENT ENEMY USE

79. Demolition by Mechanical Means

Use a sledge hammer, pick, axe, crowbar, or any other heavy tool or object which may be readily available to destroy the following:

a. Tires, air brake chambers, brake master cylinders, all hydraulic lines, all air lines, and all hydraulic cylinders.

b. Pull arm socket and ball, axle housing, yoke mounting plugs and cap screws, and all cylinder mounting brackets.

80. Demolition by Explosives or Weapons Fire

a. Explosives. Place as many of the charges (fig. 43) as the situation permits and detonate simultaneously with detonating cord and detonator.

b. Weapons Fire. Fire at the scraper with the heaviest practical weapons available. If possible aim for the pull yoke assembly and the tires and tail assembly.

81. Other Demolition Methods

a. Scattering and concealment. Remove all easily accessible parts, including the relay-emergency valve, brake actuators, and pull arm sockets, and scatter them throughout the underbrush or tall grass, bury them in dirt or sand, or throw them into a lake, well, or other body of water.

b. Burning. Pack rags, clothing, canvas, underbrush, or any other flammable material on, under, and around the tires and brake components of the scraper. Saturate the material with gasoline or oil and ignite.

c. Submersion. Raise the apron and ejector so that the push rods of the hydraulic cylinders are exposed, and completely submerge the scraper in a body of water to provide conceal-

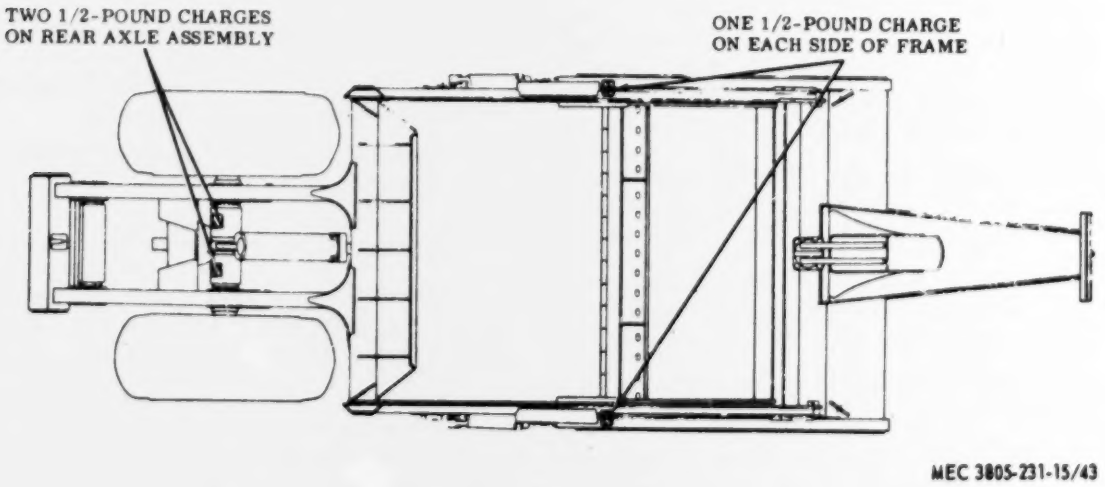

Figure 43. Placement of charges.

ment and water damage. If both salt water and fresh water are available, salt water should be used to submerge the scraper as it will cause greater damage more quickly to the mechanical parts of the scraper.

d. Misuse. Fully extend all hydraulic cylinders and, with an axe, crowbar, or other heavy, sharp-edged object, nick and score the push rods. After the push rods have been damaged, operate all control levers to destroy the seals in the cylinders.

Note. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all scrapers and all corresponding repair parts.

82. Training

All operators should receive thorough training in the destruction of the scraper. Refer to FM 5–25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual.

Section II. SHIPMENT AND LIMITED STORAGE

83. Preparation of Equipment for Shipment

a. General. This paragraph provides instructions for preparation of the item for shipment within zone of interior. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. Examine the item for any unusual conditions such as damage or missing components. Inspect the item in accordance with steps outlined in Quarterly Preventive Maintenance Services (para. 27). Deficiencies and shortcomings along with corrective action taken will be recorded on DA Form 2404 (See TM 38–750).

c. Cleaning and Drying. Cleaning and drying by an approved technique is the first essential procedure in any effective preservation process. Approved methods of cleaning and drying, types of preservatives and methods of application are described in TM 38–230.

d. Painting. Repaint all surfaces where the paint has been damaged or removed. Refer to TM 9–213 for detailed painting instructions.

e. Depreservation Guide. Record depreservation instructions on DA Form 2258 or DD Form 1397 as applicable.

f. Hydraulic Control System, Except Hydraulic Brakes.

(1) Fully retract the piston as far as the linkage will permit and secure.

(2) Coat exposed portions of the hydraulic piston rods and operating valve controls with type P–6 preservative (CL) conforming to Specification MIL–C–11796, class 3. If the preservative is not available, use Automotive and Artillery Grease (GAA) as specified on the lubrication order.

(3) Wrap with type I, class 2, grade A, barrier material conforming to MIL–B–121.

g. Marking. Mark in accordance with MIL–STD–129.

h. Pneumatic Tires. Tires shall be inflated to their normal required operating pressure.

84. Loading Equipment for Shipment

a. Load the scraper by reversing the unloading procedure outlined in paragraph 6.

b. Block and tie down the scraper as shown in A, figure 5.

85. Preparation of Equipment for Storage

a. General. This paragraph provides instructions for preparation of the item for limited storage, not to exceed six months.

b. Inspection. Examine the item for any unusual conditions such as damage or missing components. Inspect the item in accordance with steps outlined in Quarterly Preventive Maintenance Services (para 27). Deficiencies

and shortcomings along with corrective action taken will be recorded on DA Form 2404 (See TM 38–750).

c. Cleaning and Drying. Cleaning and drying by an approved technique is the first essential procedure in any effective preservation process. Approved methods of cleaning and drying, types of preservatives, and methods of application are described in TM 38–230.

d. Painting. Repaint all surfaces where the paint has been damaged or removed. Refer to TM 9–213 for detailed painting instructions.

e. Depreservation Guide. Record depreservation instructions on DA Form 2258 or DD Form 1397 as applicable.

f. Hydraulic Control System, Except Hydraulic Brakes.

(1) Fully retract the piston as far as the linkage will permit and secure.

(2) Coat exposed portions of the hydraulic piston rods and operating valve controls with type P–6 preservative (CL) conforming to Specification MIL–C–11796, class 3. If the preservative is not available, use Automotive and Artillery Grease (GAA) as specified on the lubrication order.

g. Pneumatic Tires. Tires shall be inflated to their normal required operating pressure.

h. Weatherproofing. When suitable shelter is not available, select a firm, level, well-drained storage location, protected from prevailing winds. Position the equipment on heavy planking or other solid surfaces. Cover the equipment with a tarpaulin or other suitable waterproof covering and tie down securely.

86. Inspection and Maintenance of Equipment in Storage

When the item has been placed in limited storage, all scheduled preventive maintenance services including inspection, shall be performed as specified herein. Perform quarterly preventive maintenance services when the item is initially placed in limited storage and every 90 days thereafter. Record all deficiencies and shortcomings, together with corrective action taken, on DA Form 2404. Required maintenance will be performed promptly to insure that the item is mechanically sound and ready for immediate use. After inspection and maintenance services, represerve any damaged preservation as outlined in paragraph 85.

APPENDIX I

REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320–5	Dictionary of United States Army Terms.
AR 320–50	Authorized Abbreviations and Brevity Codes.

2. Fire Protection

SB 5–111	Supply of DA Approved Fire Extinguishers to Army Troop Users.
TM 5–687	Repair and Utilities: Fire Protection Equipment and Appliances: Inspections, Operations, and Preventive Maintenance.

3. Lubrication

LO 5–3805–321–15	Lubrication Order: Scraper, Euclid, Model 58SH–G.

4. Painting

TM 9–213	Painting Instructions for Field Use.

5. Preventive Maintenance

AR 750–5	Organization, Policies and Responsibilities for Maintenance Operation.
TB ENG 347	Winterization Techniques for Engineer Equipment.
TM 9–207	Operation and Maintenance of Army Materiel in Extreme Cold Weather (0° to —65° F.).
TM 38–750	Army Equipment Record Procedures.

6. Publication Indexes

DA Pam 108–1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310–1	Index of Administrative Publications.
DA Pam 310–2	Index of Blank Forms.
DA Pam 310–3	Index of Doctrinal Training and Organizational Publication.
DA Pam 310–4	Index of Technical Manuals, Technical Bulletins Supply Manuals (Types 4, 6, 7, 8 and 9).
DA Pam 310–5	Index of Graphic Training Aids and Devices.
DA Pam 310–25	Index of Supply Manuals. Engineer type items.

7. Shipment and Limited Storage

TM 38–230	Preservation; Packaging, and Packing of Military Supplies and Equipment.
MIL–B–121	Barrier Material, Greaseproofed, Waterproofed, Flexible.
MIL–C–11796	Corrosion Preventive, Petrolatum, Hot Application.
MIL–STD–129	Marking for Shipment and Storage.

8. Supply Publications

FSC C9100–IL	FSC Group 91: Fuels, Lubricants, Oils and Waxes.

9. Training Aids

FM 5–25	Explosive and Demolition.
FM 21–5	Military Training.
FM 21–6	Techniques of Military Instruction.
FM 21–30	Military Symbols.

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APPENDIX II

BASIC ISSUE ITEMS LIST, MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required for maintenance and operation by the operator, initially issued with, or authorized for the scraper. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

(1) *Materiel.* This column is left blank. For identification of agencies assigned supply responsibility for parts, refer to appropriate Federal and Department of the Army supply catalogs.

(2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(*a*) P—applied to high-mortality repair parts which are stocked in or supplied from the supply service depot system, and authorized for use at indicated maintenance level.

(*b*) P1—applied to repair parts which are low-mortality parts, stocked in or supplied from supply service dep-ots, and authorized for installation at indicated maintenance level.

(*c*) M—applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance level.

(*d*) X2—applied to repair parts which are not stocked. The indicated maintenance level requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(3) *Maintenance.* The lowest maintenance level authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O—Organizational maintenance

(4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

(*a*) R—applied to repair parts and assemblies which are economically repairable at direct and general support maintenance activities and normally are furnished by supply on an exchange basis.

(*b*) T—applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance facilities.

(*c*) U—applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high-dollar value reusable casings, castings, and the like.

Note. When no code is shown in the recoverability column the part is considered expendable.

b. Federal Stock Number. When a Federal stock number is available for a part, it will be shown in this column, and will be used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for services is shown in parentheses followed by the manufacturer's part number. This number shall be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column. Example: (08645) 86543.

(3) The letters GE, shown in parentheses immediately following the description, indicates General Engineer supply responsibility for the part.

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities of repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

g. Illustrations. This column is subdivided into two columns which provide the following information:

(1) *Figure number.* Provides the identifying number of the illustration.

(2) *Item number.* Provides the referenced number for the parts shown in the illustration.

3. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

b. Component Application. This column identifies the component application of each maintenance or operating supply item.

c. Source of Supply. This column is left blank. For identification of agencies assigned supply responsibility for parts, refer to appropriate Federal and Department of the Army Supply Catalogs.

d. Federal Stock Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

e. Description. The item and a brief description are shown.

f. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

g. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirements for an average eight hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding column.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal stock No.	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Material	Source	Maintenance	Recoverability						Figure	Item
					GROUP 31—BASIC ISSUE ITEMS, MANUFACTURER INSTALLED					
					3100—BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED					
	P	O		7510-889-3494	BINDER, LOOSE-LEAF: U. S. Army Equipment Log Book.			1	1	
					Note. Intial issue and replacement will be made in accordance with TM 38-750.					
	P	O		7520-559-9618	CASE: Maintenance and Operational Manuals, Cotton Duck, Water Repellent, Mildew resistant, MIL-B-11743			1	1	
					DEPARTMENT OF THE ARMY LUBRICATION ORDER LO 5-3805-231-15			1	1	
					DEPARTMENT OF THE ARMY OPERATOR, ORGANIZATIONAL DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL TM 5-3805-231-15			2	2	
	X2	O			WRENCH, WHEEL-NUT (97907) Pt No. not assigned			1	1	
					GROUP 32—BASIC ISSUE ITEMS, TROOP INSTALLED					
	-				3200—BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED					
	P	O		4930-360-2801	GUN, LUBRICATING: Lever type, 16 oz. capacity w/extension and hydraulic coupling			1	*	
	P	O		5120-242-3917	HAMMER, HAND: Machinists ballpeen 1 lb.			1	*	
	P1	O		4930-273-3644	OILER, HAND: 12 oz. capacity			1	*	
	P1	O		5120-223-7397	PLIERS, SLIP-JOINT: Sight nose, comb. w/cutter 8 in. lg.			1	*	
	P1	O		5120-227-7362	SCREWDRIVER, FLAT-TIP: 12 in. lg.			1	*	
	P1	O		5120-449-8083	WRENCH, OPEN END, ADJUSTABLE: agle-hd 0 to 1.135 in. jaw opng. 10 in. lg.			1	*	

Section III. MAINTENANCE AND OPERATING SUPPLIES

Item	Component Application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	4309 HYDRAULIC TANK (1)			LUBRICATING OIL 1 qt can as follows:			(1) Includes quantity of oil to fill oil system.
			9150-265-9425 (2)	OE-10	4 qt	(3)	4 qt Hydraulic tank
			9150-242-7602 (2)	OES	4 qt	(3)	
				GREASE, AUTOMOTIVE AND ARTILLERY 5 lb can as follows:			(2) See C9100-IL for additional data and requisitioning procedure.
			9150-190-0905 (2)	GAA	5 lb	As req	(3) See current LO for grade application and replenishment intervals.

APPENDIX III

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

a. Section I provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance operations on the identified end item or component. The implementation of the maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

c. Section III lists the special tools and test equipment required for each maintenance operation as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

2. Explanation of Columns in Section II

a. Functional Group Number. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1 Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains a brief description of the components of each functional group.

c. Essentiality. The essentiality column reflects whether or not an assembly, or repair part, is combat essential to the tactical use of the end item. The letter "E" in this column indicates an item is combat essential.

d. Maintenance Operations and Maintenance Levels. This column lists the various maintenance operations ("A" through "J") and indicates the lowest maintenance level authorized to perform these operations.

The symbol designations for the various maintenance levels are as follows:

O/C—Operator or crew
O —Organizational
DS —Direct Support
GS —General Support
D —Depot

The Maintenance Operations are defined as follows:

A—SERVICE: Operations required periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and deicing fluids, or compressed air supplies.

B—ADJUST: Regulate periodically to prevent malfunction. Adjustments will be made commensurate with adjustment procedures and associated equipment specifications.

C—ALINE: Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

D—CALIBRATE: Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

E—INSPECT: Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

F—TEST: Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Tests will be made commensurate with test procedures and with calibrated tools and/or test equipment referenced in the MAC.

G—REPLACE: Substitute serviceable components, assemblies and subassemblies for unserviceable counterparts or remove and install the same item when required for the performance of other maintenance operations.

H—REPAIR: Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills—to include welding, grinding, riveting, straightening, adjusting and facing.

I—OVERHAUL: Restore an item to a completely serviceable condition (as prescribed by serviceability standards developed and published by the commodity commands) by employing techniques of "Inspect and Repair Only as Necessary (IROAN). Maximum use of diagnostic and test equipment is used with minimum disassembly during overhaul. "Overhaul" may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

J—REBUILD: Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassembling using serviceable, rebuilt, or new assemblies, subassemblies and parts.

e. Reference Note. This column, subdivided into columns "K" and "L", is provided for referencing the SPECIAL TOOL AND TEST EQUIPMENT REQUIREMENTS (Section III) and REMARKS (Section IV) that may be associated with maintenance operations (Section II).

3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T & TE requirements column on the MAC.

The letter represents the specific maintenance operation the item is to be used with. The letter is representative of columns "A" through "J" on the MAC.

b. Maintenance Level. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal Stock Number, of tools and test equipment.

5. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column L and the second letter references a maintenance operation, column "A" through "J".

b. Remarks. This column lists information pertinent to the maintenance operation being performed, as indicated on the MAS section II.

Section II. MAINTENANCE ALLOCATION CHART

Functional Group Number	Component Assembly Nomenclature	Essentiality	Maintenance operations A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	Maintenance levels G Replace	H Repair	I Overhaul	J Rebuild	Ref Note K T&TE EQMT	L Remarks
11	REAR AXLE													
1100	Rear Axle Assembly													
	Axle, Rear								O					
	Bearings and Seals								O					
12	BRAKES													
1202	Service Brakes													
	Brakes		O/C	O					O	DS				
1208	Air Brake System													
	Chamber, Brake								O	DS				
	Lines and Fittings								O					
	Valves								O	DS				
13	WHEELS													
1311	Wheel Assembly													
	Bearings and Seals								O					
	Wheels								O	DS				
1313	Tires													
	Tires		O/C						O	DS				
15	FRAME													
1507	Landing Gear, Leveling Jacks													
	Landing Gear, Leveling Jacks								O	DS				
22	BODY CHASSIS OR HULL AND ACCESSORY ITEMS													
2210	Data Plates													
	Plates, Data								DS					
	Plates, Instruction								O					
26	TOOLS													
2604	Special Tools													
	Tools, Special								O					
43	HYDRAULIC SYSTEM													
4300	Hydraulic System													
	Hydraulic System								DS					
4301	Strainers, Filters, Hose, Pipe Fittings, Tubing													
	Hose								O					
	Pipes and Fittings								O					
4305	Manifold and/or Control Valves													
	Manifold								O	O				
4307	Hydraulic Cylinders													
	Cylinder, Hydraulic								O	DS				
74	EARTH MOVING EQUIPMENT COMPONENTS													
7444	Main Body													
	Body Assembly		O/C						GS	DS				
7447	Push Beam and Yoke Components													
	Bearings and Seals								DS					
	Beam, Push								DS	DS				
	Yoke		O/C						DS	DS				
7448	Bowl and Discharge Components													
	Apron								DS					
	Bowl, Tilting Discharge		O/C						GS	DS				
	Pulleys, Pins, Bearings								O	O				

Section III. SPECIAL TOOL AND TEST EQUIPMENT REQUIREMENTS

FOR: Scraper, earth moving
(Euclid Model 58SH–G)

Reference code	Maintenance Level	Nomenclature	Tool No
		No special tools or equipment required to preform maintenance on the scraper.	

Section IV. REMARKS

FOR: Scraper, earth moving
(Euclid Model 58SH–G)

Reference code	Remarks
	No special notes required.

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For explanation of abbreviations used, see AR 320-50.

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